



Smart Neighborhood Project



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2202



جامعة الجميع الذكية
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Project's Members name

No	Member Name	Member ID	Role
1	Kholood Almarri	2021206111	Leader
2	Waleed Almatrafi	2021206186	Member
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4	Mansour Balharith	2021203035	Member
5	Hasan Ali Ahmed	2021206149	Member
6	Abdullah AlAhmari	2021206135	Member
7	Shady Simbawa	2021206082	Member
8	Abdulaziz AlEssa	2021206170	Member
9	Muhannad Al Omran	2021206162	Member
10	Mada AlOtaibi	2021206092	Member



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Introduction:

Most of the Arab countries, including the Kingdom of Saudi Arabia, are facing major challenges regarding modern urban planning for cities, and smart neighborhoods have become a major goal to overcome these challenges. Our company's role is to contribute directly to the establishment of safer and more livable neighborhoods through the implementation of the latest infrastructure, products and technical services distinguished by the latest smart solutions that will improve lifestyles and achieve the Kingdom's Vision 2030.

Chapter 1: Strategy - Governance, Structure, and Process

First Main Subject: Strategy

Vision:

Our vision is to become one of the leading companies in building smart neighborhoods by utilizing the latest technologies and playing a major role in spreading and implementing the concept of smart cities in the Middle East. **(Join our world to live a smart life).**

Mission:

Improving the lives in the cities by providing an ideal housing environment and implementing technology projects with smart solutions and providing the best services and products in the fields of (Safety and Security, Renewal Energy and Enhance Environment) to contribute and committed to improving the lifestyle and sustainability.



Objectives in SMART model:

There are four main objectives that focus on achieving the main topic of our project (Security and Safety - Renewable Energy- Enhance Environment) as following:

- 1- Enhancing the security level in the neighborhood by designing and installing (100) security surveillance cameras within a maximum period of (24) months so that the neighborhood is monitored through the control center and contributing to Reduce crimes rate around 70%.
- 2- Achieving the level of road safety by installing (20) smart traffic lights within (17) months and linking them to the control center and monitoring the traffic flow on the roads for reducing accident rate around 60%.
- 3- Using renewable energy by installing (20) solar energy for smart traffic signals and reducing electricity operational costs around 50%
- 4- Enhance Environment by planting (150,000) trees in the neighborhood according to the specifications and conditions of the Ministry of Environment, Water and Agriculture within a maximum period of (24) months for providing a clean environment and contributing to reduce pollution by 30%, and decreasing the temperature by 10%.

Project Key Performance Measurement Indicators:

Strategic Objectives	Lead measure	Lag measure
Enhancing the security level in the neighborhood	Number of security surveillance cameras installed all streets	Crime ratio Average People feel safe
Achieving the level of road safety	Number of smart traffic light installed in streets	Accident cars ratio decrease
Renewable Energy	Number of solar energy installed	electricity operational costs decrease
Enhance Environment	Number of trees planted	Pollution ratio Temperature ratio

Table5: KPIs, lead and lag measures



Project Charter Model:

Ahmed Ali	Project charter Model Builder	Project Charter	
22 April 2022	Creation date of the charter		
Khaled Nasser	Project manager	Saudi Arabia, Riyadh	Project address
aliahmed@hotmail.com	Project manager email	0553020001	Mobile No. project manager
Ministry of Municipal and Rural Affairs and Housing	The official sponsor of the project	1 Jan 2023	Project start date
2 years 3 million SAR			The project implementation period and Cost
The final output of the project			
Smart neighborhood is governed by high-performance technical, digital and electronic principle			
Project rationale			
Permit to build a smart neighborhood and sign an agreement with the Ministry to be the official sponsor of the project			
Project Description			
The company improves the lives of residents and provides an ideal housing environment by implementing technology projects with smart solutions and providing the best services and products in the fields of (safety, security, Renewable energy and enhanced Environment) to contribute to improving the lifestyle and sustainability.			
Project requirements			



4- land in a strategic and big area 5- availability of building designers and technicians with experience that reflects the culture in a creative and technical way	1-The official sponsor and executer companies 2-Executors and a work team with sufficient experience 3-Permits for all phases of the project
Risks that may occur to the project	
1- Not having enough cash and budget to complete the project 2-finish the project in the target date and time 3- bad weather, which causes delays in implementation or damage to some building material 4- Lack of designers with ambitious experience for the project 5-Late import of some materials due to shipping problems	
Project manager Signature	
	

Table 6: Project Charter model



Second Main Subject: Governance, Structure, and Process

Project Organizational Structure:

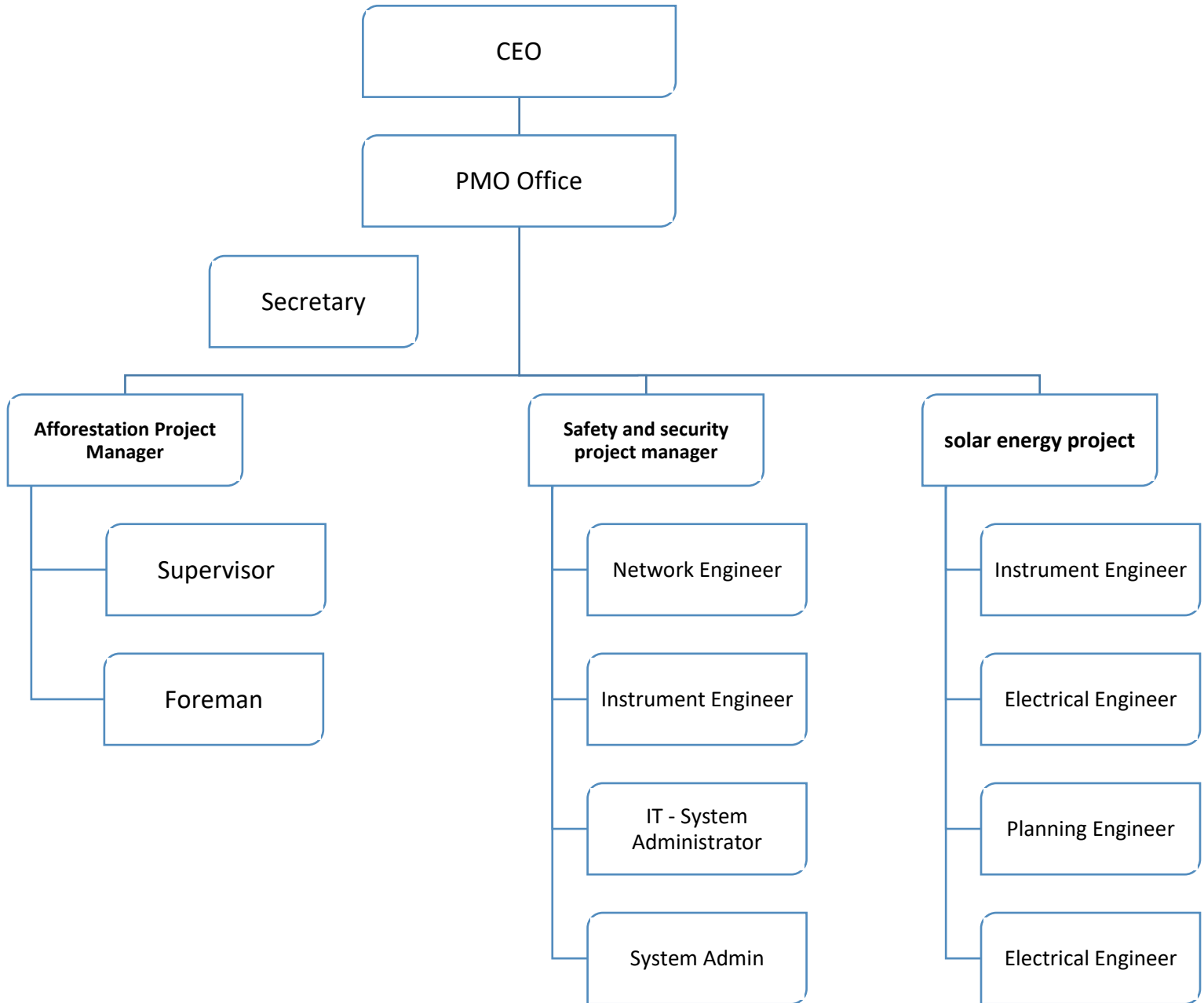


Figure1: Project Organizational Structure



The practical and scientific bases, adopted in developing the structure:

This project depends on a hierarchical structure which resembles a pyramid. This follows a chain of command from the top executives to regular employees. Authority ensures that everyone under a manager's command will work towards the organization's goals. In this structure the board directed to the top of the pyramid. Then, middle managers in the second level, and the workers in the bottom. (1)

Project model:

Types of Project Management Offices:

1- Supportive PMO (Low control):

This type provides support as consultations available upon request. It also provides forms, information, technical support and training to the project team without imposing control on their project or activities. This type of office fits institutions that are known for their successful projects and are only in need of some sort of data center. It's also characterized by its low level of control on projects and teams, in addition to following unified standards in all projects.

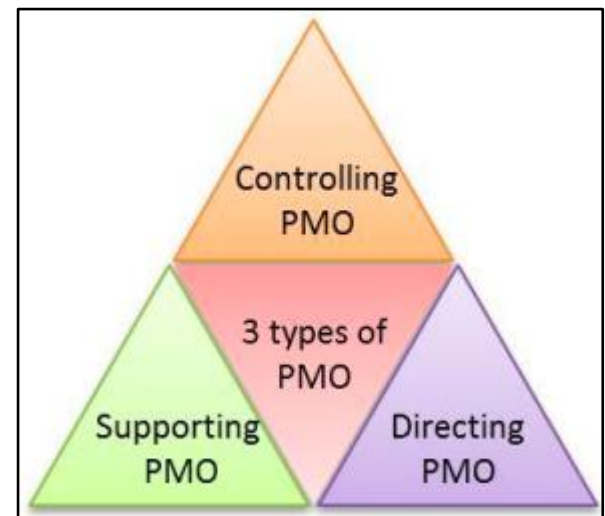


Figure 2: Types of Project Management

2- Controlling PMO (Moderate control):

This type of office provides a unified framework for the institution, which requires adjustments and modifications on the used methodologies, as well as forms and applications. Also, it imposes a moderate level of control on projects and their activities. This form is used within institutions that are interested in having some control on their activities, processes and procedures.



3- Directive PMO (High control):

This type is known for its high control on projects, or even fully managing projects with providing needed resources and support. The office defines managers to run it directly after contacting the PMO project. This type also provides high professionalism in managing projects, where every manager has to write periodic reports for the office which guarantees a high level of consistency in work on projects level. This type fits big institutions that need technical support in many and various places. (2)

Our project model choice is "**Directive PMO**" because in the 'smart neighborhood' we will be needing high control, professionalism and fully managing the project with providing needed resources and support to guarantee a high level of consistency in all project levels.



Chapter 2: Compliance, Standard, and Regulations - Power and Interest - Culture and Values

First Main Subject: Compliance, Standard, and Regulations

Compliance model:

Project title	Smart neighborhood in KSA	The owner	Ahmed Ali	main contractor : United Group
Reference		Day :		Date :

Requirements			Compliance		
No .	Goal or production	Executer or Responsible	Goal Description	Compliance (yes /No /not applicable)	Comments
1	Achieving a high level of quality standards	Quality management	Achieving quality standards and safety of public facilities, as well as achieving the highest standards of comfort	Yes	
2	Fast exchange of information	Information Technology management NETWORK Engineering	Providing an information system that provides the largest amount of data through high-accuracy and fast technical means	Yes	
3	Reducing transportation cost and its risks	Environment, health ,safety ,security management (EHSS Dept.)	Expanding service transportation options open to consumers, their databases, and attention to the cleanliness of the environment from pollutants	Yes	
4	Creating a spirit of public participation and interaction in civilized decision-making	management of Housing	Providing databases for consumers for evaluating & criticizing it	Yes	
5	Achieving the concept of sustainability	Process engineering Dept. & EHSS Dept.	Achieving advanced levels of organization and smart dealing with urban environmental variables, which reduces waste and tampering with the capabilities of the environment	Yes	
6	Urban competition from other smart cities in other countries	Quality assurance management & investment management	Entering the race to compete with other cities through services and investment	Yes	

Table 7: Compliance model



Checklist model for the project stages:

The Project Management Life Cycle consists of phases: (Initiation, Planning, Execution, Monitoring and Controlling, and Closing). Matthew Martin defines these phases as following:

- 1- **Initiation Phase:** "Initiation phase defines those processes that are required to start a new project. The purpose of the project initiation phase is to determine what the project should accomplish. This phase mainly consists of two main activities: (Develop Project Charter and Identify Stakeholders)".
- 2- **Planning Phase:** "Project Planning phase covers about 50% of the whole process. Planning phase determines the scope of the project as well as the objective of the project. It begins with the outputs of the initiation phase (charter, preliminary scope statement, and project manager). The output of the planning phase serves as the input for the execution phase".
- 3- **Execution Phase:** "The executing phase consists of those activities that are defined in the project management plan. This process involves managing stakeholder expectations, coordinating with people and resources, as well as performing other activities related to project deliverables. During the execution phase, the result may require re-baselining and updates to existing project requirements. Action taken in the execution phase may affect the project management plan or documents".
- 4- **Monitoring and Controlling Phase:** "After the execution phase, to check the project is on the right track, monitoring and controlling phase becomes active. During this phase various changes and reviews to enhance the project performance are done. This stage involves tracking, reviewing and regulating the progress in order to meet the objective of the project. It also ensures that the deliverables are according to the project management plan. The main focus of this step is to identify any changes made from the point of project management plan to determine appropriate preventive action".
- 5- **Closing Phase:** "It is the process that performs a controlled shut down of the project at the end. In a project, there are three closure activities that are going on: (Closure of the product-



Getting the customer to accept the final deliverables, if the project is external, Closure of the project- This include formally closing of administrative procedures, updating project documents and archiving those databases project should be returned)". (3)

All mission/tasks for five Project Phases mention in table below:

Phase	Mission/Task	Mission/Task Duration	Phase Duration	Comments
Initiation	Business Case		Two Month	
	Feasibility Study			
	Develop Project charter			
	Identify Stakeholder			
	Generate Organizational Structure			
Planning	Develop Project Management Plan		Nine Months	
	Scope Management Plan			
	Collect Project Requirements			
	Define Scope			
	Prepare WBS			
	Identify Goals/Deliverables			
	Time Schedule Plan			
	Identify Activities			
	Sequence Activities			
	Estimate Activities duration			
	Develop Time Schedule			
	Cost Management Plan			
	Estimate Cost			
	Calculate Budget			
	Quality Management Plan			
	Resource Management Plan			
	Communication Management Plan			
	Risk Management Plan			
	Identify Risks			
	Procurement Management Plan			
	Stakeholder Management Plan			
Execution	Direct/Managing Work Project		Ten Months	
	Managing Project Knowledge			
	Quality Management			
	Acquire Resources			
	Develop Team			
	Communication Management			



	Appling Risk Response			
	Conduct Procurements			
	Stakeholder Participation Management			
Monitoring and Controlling	Control/Monitor Work Project		During Project Phases	
	Scope Validate			
	Scope Control			
	Schedule Control			
	Cost Control			
	Quality Control			
	Resource Control			
	Communication Monitor			
	Risks Monitor			
	Procurement Control			
	Stakeholder Participation Monitor			
Closing	Finishing all activities Project		Three Months	
	Review and Submit Final Report			

Table 8: Checklist model for the project stages

Second Main Subject: Power and Interest

STAKEHOLDERS ANALYSIS

NO	Name	Title	Category	Role	Information contact	Communication way
1	Lady Sogate	Project Manager	Internal	Supervising & completing the project	Lasy@gmail.com +966548741254	- F2F - Email
2	Abdulrahman Saad	Engineer	Internal	Solving the Issues	ABD.1990@hotmail.com +966555441178	- Phone - F2F
3	Saud Al-Mohammadi	Contract representative	Internal	Representing the company while dealing with third party	Saud.35@gmail.com	- Email - F2F - Phone
4	Our Company employees	Support	Internal	Support	Help achieving the organization's goals	- Email - F2F - Phone
5	Community	-	External	Help and support the smart neighborhood	Messages via smart robot	Messages



6	third party company	MKC	External	Smart Neighborhood Afforestation	Lama@MKC.com	Company Mail
7	Government	Government	External	Logistics and facilities	ATTS@gov.com	Mail
8	Stockholders	Stockholders	Internal	Financial support	Bord@hotmail.com	Via CEO

Table 9: Stakeholders Register

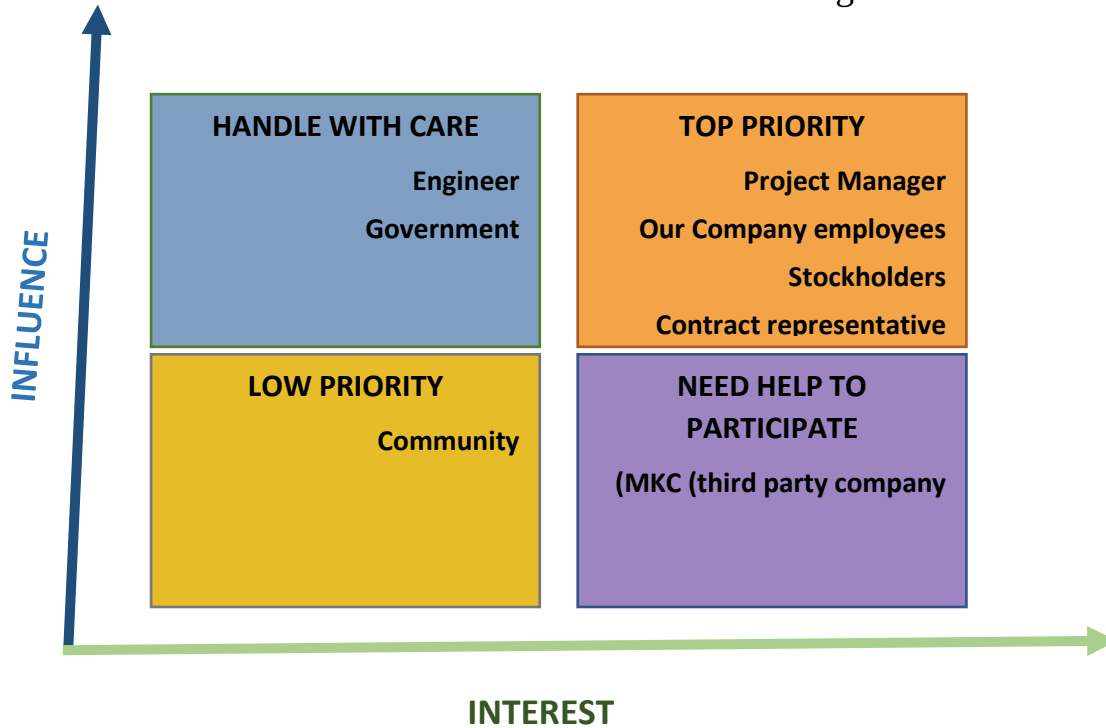


Figure 3: Interest and Influence diagram

- **TOP PRIORITY:** HIGH INFLUENCE AND HIGH STAKE.
- **HANDLE WITH CARE:** HIGH INFLUENCE AND LOW STAKE.
- **NEED HELP TO PARTICIPATE:** LOW INFLUENCE AND HIGH STAKE.
- **LOW PRIORITY:** LOW INFLUENCE AND LOW STAKE. (4)



Logical Diagrams:

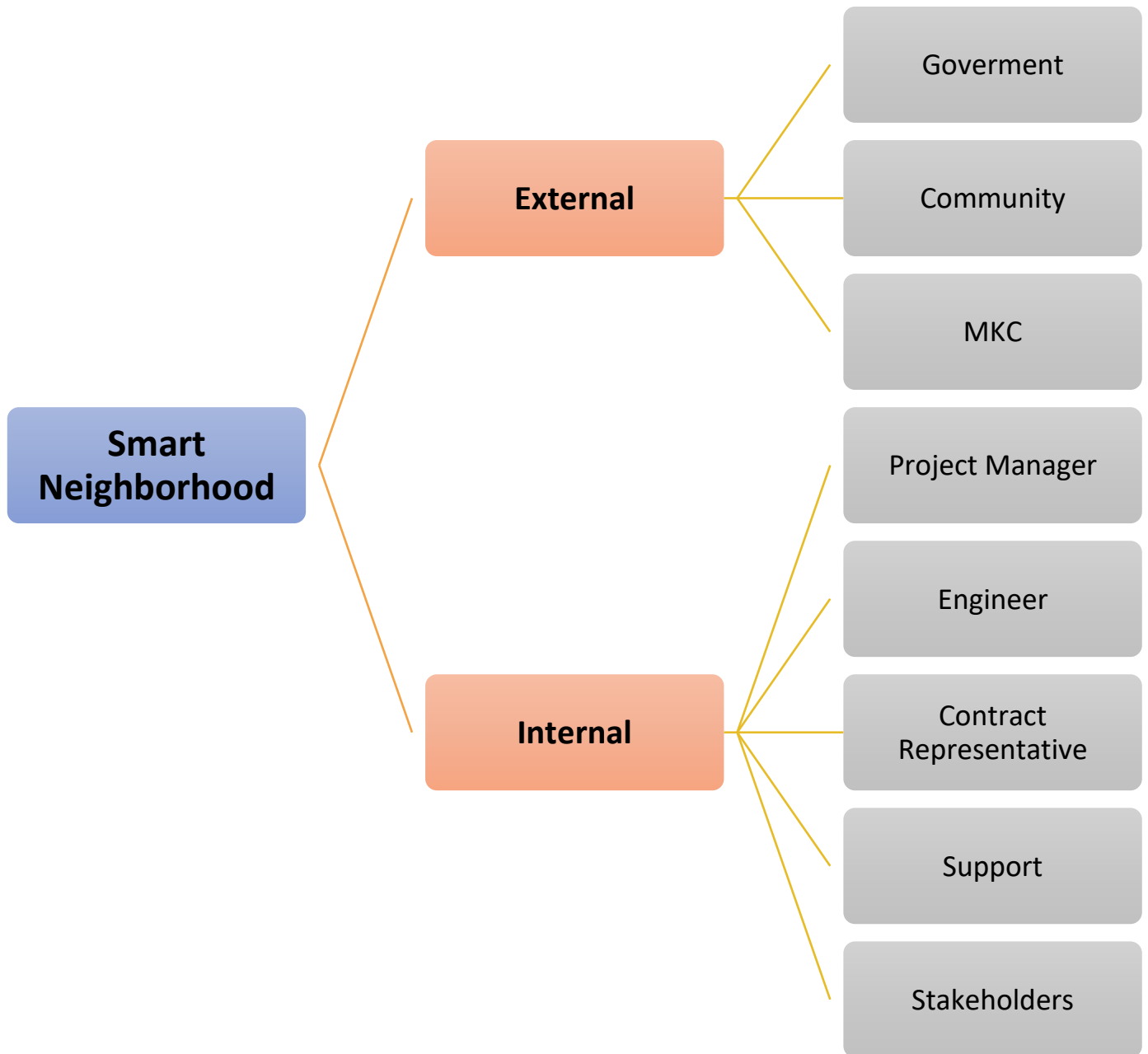


Figure 4: logical diagram for register of the Stakeholder



Third Main Subject: Cultures and Values

Organization culture: inventiveness:

It is one of the special features that are interested in implementing the work of institutions as it relies on classifying innovation among their priorities. It also encourages employees to take risks and ensure innovation within their jobs.

Attention to detail:

It is one of the characteristics and characteristics associated with the culture of the organization. Employees are expected to be more accurate in carrying out their work, which depends on their interest in the details that contribute to their performance of their work in an accurate manner.

Focus on results:

It is the interest of companies in achieving results that are important values in the organization's culture, in order to obtain distinctive results.

Attention to individuals:

It is one of the characteristics that institutions classify as high values. The culture of the institution is concerned with the nature of the impact of institutional decisions on individuals, and institutions are also interested in applying treatment that preserves the dignity and respect for employees.

Teamwork:

It is the cooperative method that organizes all special activities in the work environment. The culture of the organization seeks to form teams and ensure positive relations between employees and managers at work.

competitive:

It is one of the characteristics encouraged by the culture of the enterprise. Companies are expected to be keen to deal with their competitors in the market, and a company with a competitive culture provides a high competitiveness in the market.

**Stabilization:**

It is one of the basic rules of enterprise culture. Companies are keen to establish a continuous and predictable cultural value, which contributes to guessing productivity levels, work and in the best possible conditions within the unstable market.

Organization values:

Our values that can make your property more secure & safe. Complete Security Surveillance Solution for your Home or Office in Saudi Arabia.

Accountability: We honor our commitments and protect the confidentiality of information.

Availability: our team supports 24/7/365.

Ingenuity: our team professional to implement our systems in cities and provide latest technology to our customers.



Chapter 3: Self-reflection and Self-management - Personal integrity and reliability - Personal Communication

First Main Subject: Self-reflection and Self-management

Personal behaviors that can influence the project:

It is very important in any work environment to avoid negative behaviors because of their impact on the workflow of the system. Listed below are some of the negative behaviors:

- Absences
- Complaints
- Lack of Responsibility

1-Absence:

Reasons:

1. Family circumstances.
2. Differences in the working hours in the project team.

Solutions:

1. Agree on a specific time that suits everyone to avoid missing meetings.
2. Recording meetings so that members can view them and submit meeting minutes to everyone.

2-Complaining:

Reasons:

1. Misunderstand the requirements of the project.
2. Continuous absence from team meetings or lectures by doctors of the subject.

Solutions:

1. Alert team members to the necessity of attending the lectures of doctors.
2. Attempting to clarify and simplify the tasks assigned to them by members or the team leader.



3-Lack of responsibility:

Reasons:

1. Reliance on other team members.
2. They do not feel supported and do not work as one team.

Solutions:

1. The team leader alerts him.
2. Try to Support them, and involve them in decisions and discussions within the team.

SWOT ANALYSIS (5)

Strengths	Weaknesses	Opportunities	Threats
● High-level engineering team. ● Provide protection and security. ● clean environment. ● Suitable environment for children. ● Rely on sustainable energy.	● high cost. ● Marketing the idea to investors. ● Current rules and regulations of the government might not support all project goals.	● promising market. ● People's desire to live in a new concept.	● market competitors. ● Delay in issuing government approvals. ● Price of construction materials changing with high variance due to the word inflation 2022.

Table 10: SWOT analysis



Second Main Subject: Personal integrity and reliability

Behaviors that contradict moral integrity:

Behavior	Financial	Social	Technical
Bribery	Although obtaining exact figures on the economic costs of corruption is difficult, a 2016 report from the International Monetary Fund (IMF) estimated the cost of bribery alone to be between \$1.5 to \$2 trillion per year. This represents a total economic loss of approximately 2% of global GDP. bribery yields any selective benefits for the firm & Raising business costs.	Destroying company reputation and prevents customers and companies from dealing with them.	Diminished company capacity & Increasing polarization (When corruption, in particular company capture, becomes the norm, this can lead to polarization among employees: those in support of corrupt regimes (because of kickbacks and handouts) versus those opposed to them)
Conflict	Conflicts of interest can affect the payment of financial dues in the company to employees, suppliers and beneficiaries	Conflicts of interest can affect the payment of financial dues in the company to employees, suppliers and beneficiaries	Low recruitment of competent employees due to their lack of confidence in a clear company policy
Maintaining the required standards		The company has a reputation that it is a low-rated company that does not deal with the required standards and does not trust it	Failure to comply with the required standards affects the duties of an official as a watchdog, thereby losing independence and integrity in the performance of his duties.

Table 11: Behaviors that contradict moral integrity



Third Main Subject: Personal Communication

Stakeholder:

Please refer to the mentioned table page 18.

Personal and effective communication: (6)

Effective project communication is considered one of the important factors to achieve success through which information is delivered at the right time and to the right person in a clear manner. Communicating between all parties to the project through email as a primary means and other auxiliary elements such as WhatsApp groups or holding periodic direct meetings to provide the necessary information and support to all parties to the project.

Project communications management steps:

1. Determine the parties involved in the project.
2. Communication planning.
3. Dissemination of information.
4. Managing stakeholder expectations.
5. Drafting a performance report.

Shapes of communication:

Communication skills are highly essential for a strong and healthy work culture. It is an act of sharing information from one person or group to another. However, there are 4 different shapes of communication: verbal communication, nonverbal communication, written communication, and visual communication.

1. Verbal communication:

Verbal communication is one of the preeminent methods of communication that is done when two or more people speak with each other. It can either be face-to-face, conference call, skype, and more. Besides that, some verbal communications are also done in a casual format, such as casually speaking with a colleague in the office. Verbal communication is one of the most common types



of communication that is often used during video conferences, phone calls, presentations, one-to-one conversations, and more

2. Nonverbal communication:

Nonverbal communication is one of the 4 types of communication that is used to communicate without words. Body posture, eye contact, and facial expressions are some of the preeminent elements of nonverbal communication. In simple words, it is the passive form of communication through which you represent your thoughts and feelings. You can also communicate and represent yourself via how you dress.

3. Written communication:

Written communication is one of the best techniques of communication, which is the act of writing, typing, and printing symbols to convey the message to the audience. It is highly helpful because it records the information in written form for reference. However, the information is generally shared through blogs, letters, books, pamphlets, memos, emails, and more. For better understanding, you can communicate your business planning writing form to ensure that everyone gets the same message for future reference.

4. Visual communication:

Visual communication is one of the other forms of communication that can be characterized as the preeminent helper of the organization. This type of communication can be used to provide a heavy amount of information. It is highly driven by social media platforms like YouTube, Instagram, and other digital platforms. In simple terms, it uses drawings, photographs, charts, graphs, and sketches to convey information.



Communication models:

Communication models can represent the communication process in its most basic linear form (sender and receiver), in a more interactive form that encompasses the additional element of feedback (sender, receiver, and feedback), or in a more complex model that incorporates the human elements of the sender(s) or receiver(s) and attempts to show the complexity of any communication that involves people. can be split into three categories:

- Linear models – only look at one-way communication.
- Interactive models – looks at two-way communication.
- Transactional models – looks at two-way communication where the message gets more complex as the communication event (e.g. conversation) progresses.

Model of communication:

Type of model brief description:

1-Aristotle's model linear:

Aristotle argues that we should look at five elements of a communication event to analyze how best to communicate: speaker, speech, occasion, target audience and effect.

2-Lasswell's model linear:

Lasswell's model is a basic framework for analyzing one-way communication by asking five questions: Who, said what, through which channel, to whom, with what effects?

3-Shannon-Weaver model linear:

The Shannon-Weaver model is the first to highlight the role of 'noise' in communication, which can disrupt or alter a message between sender and receiver.



4-Berlo's S-M-C-R model linear:

Berlo's S-M-C-R model explains communication in four steps: Source, Message, Channel, and Receiver.

5-Osgood-Schramm model: Interactive

The Osgood-Schramm model looks at reciprocal communication, showing how we have to encode, decode, and interpret information in real-time during a conversation.

6-Westley and Maclean model: Interactive

The Westley and Maclean model shows that our communication is influenced by environmental, cultural and personal factors.

7-Barnlund's transactional model: Transactional

Barnlund's Transactional Model of Communication highlights the role of private and public cues that impact our messages.

8-Dance's Helical model transactional:

Dance's Helical Model sees communication as a circular process that gets more and more complex as communication occurs, which can be represented by a helical spiral.

Channels of communication:

- | | | | |
|----------------------|----------------------|----------------------------|------------------------------|
| - Email | - Video conferencing | - Phone calls | - Instant messaging (IM) |
| - Direct | - Indirect | - Presentations | - Face-to-face conversations |
| - Audio conferencing | - Blog | - Formal written documents | |



Communication Matrix Timeline:

Communication	Purpose	Medium	Frequency	Audience
Kickoff Meeting	Introducing a project. Review objectives and goals	In person/face to face	Once	Project team, project sponsor, stakeholders
Daily meetings	Ensure all the action points been finalized on time	Virtual meeting/Face to Face	Daily	Project team, stakeholders
Project Team Meetings	Review status of project	Face to face or Conference call	Weekly	Project team
Technical and Creative Design Meetings	Discuss, review technical and design problems and solutions	In person/face to face	As needed	Technical team, creative team
Monthly Project Status Meetings	Update leadership on project status	Face to face or Conference call	Monthly	Project manager stakeholders
Project Status Meetings	Detailed report on project status including progress, costs, and problems	Email	Monthly	Project manager stakeholders

Table 12: Communication Matrix Timeline

Examples of three wrong scenarios of communication:

There are a limited number of reasons for communication failure. Each project manager must come to terms with these reasons to determine them within their behavior and that of others, and to take responsibility for working to resolve them.

Here we list three mis-communication scenarios and we may offer rent descriptions and why they happen as well as some tips to avoid them if possible.



● Assumption

When you walk in on a member of your team and ask him, you haven't done this important job assigned to you.

You assume several possibilities, including:

1. He knows that he must finish this work.
2. Or he knew when he was supposed to finish it.
3. Or he understands the importance of this work
4. Or you assume that he will somehow teach you that he has finished this work.

Therefore, before you ask him this question, good communication involves clarifying these assumptions that I assumed in advance by asking direct and more specific questions by opening a discussion with him that includes reminding him of that task, which you expect this member of the team to answer that he has finished the task, so good communication usually clarifies assumptions during the discussion on key points, for example when contacts have taken place, and confirms them again before the deadline.

● Lack of clarification

No one in the world can understand everything you say or some of it once you've said it or understood it, so you have to be clearer. The solution is to divide ideas until they reach a clear situation from which to explain what you are saying.

● Personal or personal considerations

When the discussion turns into personal considerations, communication is interrupted and the person exposed to an attack becomes away from serious discussion and the important place and examples of this when a task is presented to a member of the team and does not find time to



accomplish it and is answered as (your problem) because in this case the member will become a defender of his position instead of going to find better ways to communicate to solve the problem.

Stakeholder Assessment Matrix:

Stakeholder	Unaware	Resistant	Natural	Supportive	Leading
Project manager					D-C
Engineer					D-C
Contact representative				C	D
Support					D-C
Community			D-C		
MKC				D-C	
Government			D-C		

Table 13: Stakeholder assessment Matrix

C – CURRENT SITUATION

D- DESIRED SITUATION



Chapter 4: Leadership – Teamwork - Conflict and crisis

First Main Subject: Leadership

Definition of leadership: A guideline that a person or group of people must adhere to in order to maintain a well-organized environment (7)

Leadership types:

- **Dictatorial leadership**

The leader has absolute authority, forcing and guiding individuals.

- **Autocratic leadership**

It is unique in the decision-making process and develops policies and plans without the participation of subordinates. It is characterized by extreme firmness and accurate determination of the duties granted to each individual. The dictatorial leader differs as active and effective.

- **Democratic leadership**

It is characterized by the method of participation of workers in decision-making, planning and policy development.

- **Personal leadership**

Direct communication between the leader and individuals.

- **Unofficial leadership**

They are within informal social organization groups without being linked to an official function in the organizational structure.

The democratic leadership will be selected for the project because it is characterized by the method of participation of project personnel in the decision-making process, planning and policy development.



The reason for choosing the democratic leadership of the project:

It is characterized by the effective participation of the project staff in the decision-making, planning and policy making process. democratic leadership also creates a work environment full of motivated employees who yearn for success and have high confidence.

Also, shared democratic leadership may be a reason to increase productivity because it encourages employees and makes them happier when they know their opinions.

It also helps in diversity of ideas as the leader is free to consult any employee. (7)

Five proposals for the motivation methods that are compatible with the nature of the project (8)

Motivation is a major and important factor for the success of any company, as management must use appropriate methods to motivate employees to continue giving and not leak out of the companies. There are several ways to motivate employees:

1- Providing a suitable and enjoyable work environment:

An enjoyable and convenient workplace (which includes many factors: furniture, employee rest areas, furniture, lighting, office design, providing places to serve food) is one of the main motivating factors for employees as providing a pleasant and comfortable workplace will encourage creativity and increase productivity.

2- Providing moral and material rewards to employees:

Rewards are one of the most important motivating factors for employees and include, but are not limited to (increase in salaries, annual bonuses, certificates of thanks and appreciation, promotions), as they will lead to an increase in employees' confidence in themselves and their capabilities.



3- Share positive feedback.

It's great to feel fulfilled by your work. In fact, it's one of the key job satisfaction factors. Satisfaction in your work can come from a variety of places — from knowing you made the perfect cup of coffee to boosting someone's self-confidence with a brand-new haircut. And if your customers express appreciation for these things, be sure to share that feedback with your employees.

4- Involve employees in the company's achievements:

One of the most important factors that positively affect the psychology of employees and their job performance is the company's sharing of its achievements (whether the success of a particular project or the achievement of a strategic goal for the company) with its employees and that they are considered an integral part of this success.

5- Existence of management (honest, supportive, respectful):

One of the most important factors that lead to employee desertion from companies is the presence of bad treachery. The management that works to support and respect its employees and honesty in dealing with them is a key and important factor for their survival in the company and their hard work.

Second Main Subject: Teamwork

Design RACI model for 3 administrative measures of the project:

Responsibility Assignment Matrix:

It is a matrix which is an acronym that was derived from the four key responsibilities most typically used: Responsible, Accountable, Consulted, and Informed.

Responsible: Does the work to complete the task



Accountable: Delegates work and are the last ones to review the task or deliverable before it's deemed complete.

Consulted: Provides input based on how it will impact their project work or their domain of expertise on the deliverable itself.

Informed: Needs to be kept in the loop on project progress, rather than roped into details of every deliverable.

Activity	Project Manager	Third party company	Contract Representative	Stakeholders	Engineer
Supervising the project	A	C	C	I	I
A company representative	A	C	I	C	I
afforestation	I	R	A	I	C
Financial support	A		I	R	C
Problem Solving	R		I	C	A

Table 14: RACI Model



Third Main Subject: Conflict and Crisis (9)

Conflicts:

Conflict is a state of discord caused by the actual or perceived opposition of needs, values and interests. A conflict can be internal (within oneself) or external (between two or more individuals). Conflict explains many aspects of social life such as social disagreement, conflict of interests and fights between individuals, groups or organizations conflict in social settings can result in stress or tension amongst stakeholders.

How conflicts arise:

Projects are executed by people. And people or human resources make up the team. Most projects utilize the matrix structure to execute projects. And due to this structure, which creates multiple boss reporting situations, conflicts are generated automatically. In addition, project team members are assembled from diverse backgrounds, and, if in a large project, may not know each other well enough to be settled down yet, but are already striving to work towards meeting the tight deadlines. It will spell disaster if the project manager or team leader does not conduct a proper kick-off meeting or allow sufficient time for the project team members to know each other and understand their commitments. In order to minimize conflicts in this type of situation the project managers or team leaders should constantly motivate and develop the project team to lead them into accomplishing the objectives of the project.

What are some of the major barriers in a project team? The following points are noted:

- Different priorities, interest and judgment of team members
- Role conflicts
- Lack of commitment
- Communication problems



- Geographic scatter of team members
- Different Stakeholder Interests
- Change in scope

When the project progresses into the different stages of the project life cycle, i.e. from initiation, to planning, execution, and closing, it is amazing that you will find different patterns of behavior from the project team members. Some are committed and show enthusiasm in their roles whilst others may show signs of frustration and start to display symptoms of bad teamwork. Some of these symptoms are as follows:

- Lack of trust or confidence in the project manager
- Lack of synergy
- Unhealthy competitions
- Unproductive meetings

Crisis:

A crisis is a sudden and unplanned event that results in the instability of an organization and can be caused by internal or external factors.

To prevent serious damage to your company, it is important to address the factors that instigated the crisis and prevent further escalation.

Types of crisis:

Natural:

Disturbances in the environment and nature lead to natural crises. Such events are generally beyond the control of human beings. For example, Tornadoes, Earthquakes, Hurricanes, Landslides, Tsunamis, Flood, Drought all result in natural disasters.



Technological:

A technological crisis arises as a result of a failure in technology. Problems in the overall systems lead to technological crisis. For example, the breakdown of the machine, corrupted software and soon give rise to the technological crisis.

Confrontation:

Confrontation crises arise when employees fight amongst themselves. Individuals do not agree with each other and eventually depend on non-productive acts. For example, boycotts, strikes for indefinite periods, internal disputes, ineffective communication and lack of coordination give rise to confrontation crisis; employees disobey superiors; give them ultimatums and force them to accept their demands.

Malevolence:

Organizations face a crisis of malevolence when some notorious employees take the help of criminal activities and extreme steps to fulfill their demands. For example, Acts like kidnapping company's officials and false rumors, all lead to a crisis of malevolence.

Organizational Misdeeds:

Crises of organizational misdeeds arise when management makes certain decisions knowing the harmful consequences of the same towards the stakeholders and external parties. In such cases, superiors ignore the after-effects of strategies and implement the same for quick results. For example, Crisis of organizational misdeeds can be further classified into the following three types:

- Skewed Management Values
- Deception
- Management Misconduct



Deception:

Organizations face a crisis of deception when management purposely tampers data and information. For example, management makes fake promises and wrong commitments to the customers. Communicating wrong information about the organization and products lead to a crisis of deception.

Management Misconduct:

Organizations face a crisis of management misconduct when management indulges in deliberate acts of illegality. For example: accepting bribes, passing on confidential information.

Due to Workplace Violence:

Workplace violence is a type of crisis that arises when employees are indulged in violent acts. For example: beating employees, superiors in the office premises itself.

Due to Rumors:

The spreading of false rumors about the organization and brand leads to a crisis. For example, employees spreading factually inaccurate information which tarnishes the image of their organization.

Three expected Scenarios of the Conflict's event in the project:

Scenario No. 1

The project has gone through a challenging phase, which is to increase the total budget by 10% due to the increase in the value of the tax on many building materials for the project and a meeting was held between the project manager and the finance director to raise this challenge and request an increase in the total budget. During the meeting, the project manager presented the challenges that the implementation of the project would face if the increase was not provided. After the completion of the presentation, the idea of the required increase was not accepted by the CFO, and during the meeting the CFO raised his voice to the project manager and accused him of mismanagement and



that the reasons mentioned in the offer were unrealistic and might be false information for the purpose of the increase.

The CFO's discussion intensified in an uncensored and impolite manner addressed by the project manager.

Scenario No. 2

The project manager met with the team to follow up on the progress of the project implementation and during a presentation by a member of the team for the achievements, it became clear to the project manager that there was a failure to carry out one of the tasks that they did not mention and no action was taken to resolve it from the beginning, which led to a delay in the delivery of one of the outputs. The project manager questioned why the mission was delayed and why it was not taken seriously, which led to a delay in the delivery of one of the outputs, which is considered Milestone.

Scenario No. 3

The official sponsor of the project continued to request the addition of new details in the Project's identity. It was made clear to the official sponsor that the addition he requested was not the prerogative of the project manager and that it was outside the agreement of the project charter, but that the official sponsor insisted more than once to add it and meet his request.



The optimal strategies to deal with each conflict and specific the reason for performance

There are five conflict management techniques according to the Thomas Kalman model used by HR professionals. (10)

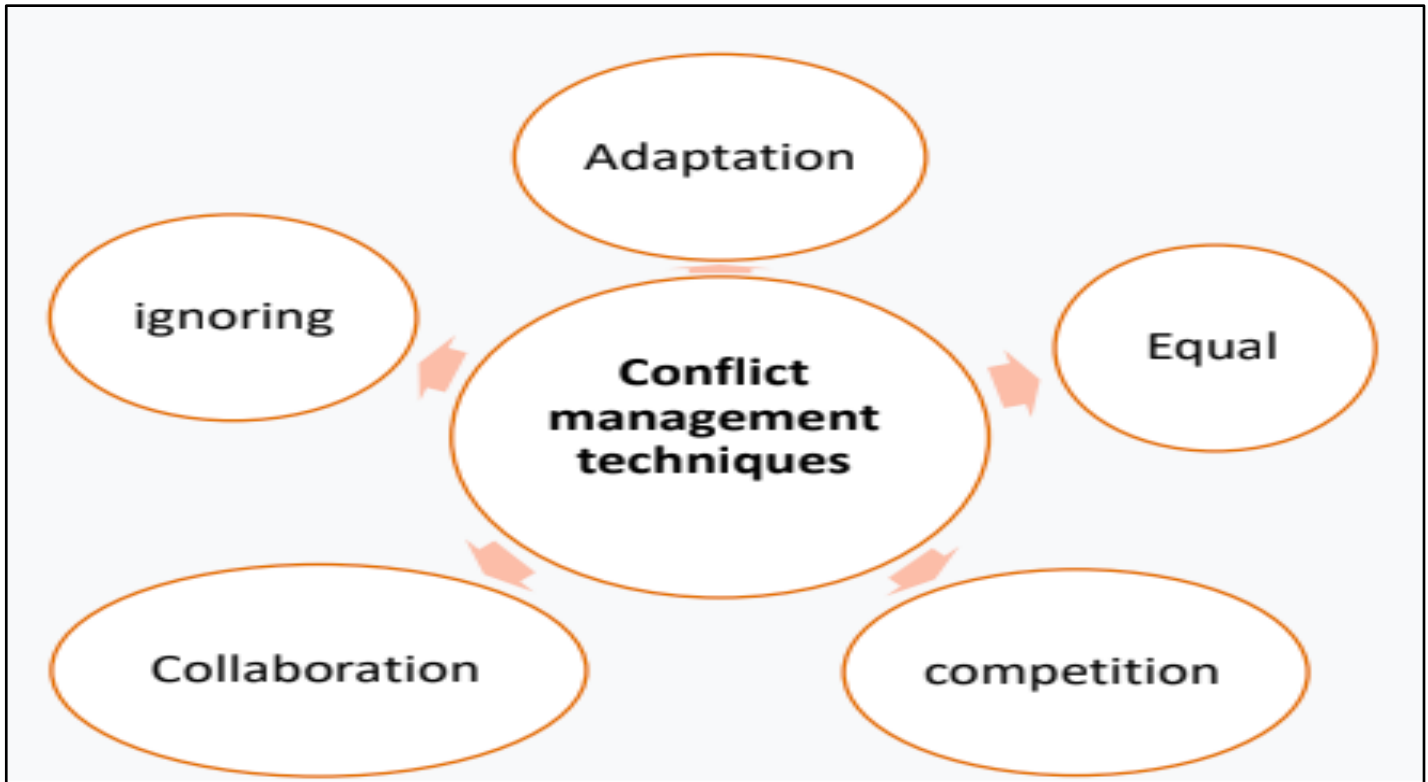


Figure 5: Conflict management techniques



Expected scenarios for the conflict that may happen during the project(10)

First Scenario: Inviting New Tools into the Mix I have seen several project management conflicts arise simply due to the introduction of new tech tools. As you start to implement a new methodology or play by the rules of a different project management technique, you will find your team getting uneasy.

In the first scenario: Adaptation with new technology is the best way to solve this problem, by making a course to train them to make it easier.

Second Scenario: Conflict may arise due to the lack of regulation of actual working hours and overtime hours. Some groups may have to work additional hours, which leads to physical and psychological exhaustion of the employees, and this will violate the rights of the employee.

In the second scenario: it is better to follow the equality method. Everyone should be given a chance to contribute to resolving the conflict, but if the avoidance method is chosen, it will overlook the conflict and make it continue.

Third Scenario: Lack of clarity in assigned positions. Conflict and problems may arise when the tasks of the positions are not defined and clarified. Some employees fail to get a clear picture of their responsibilities

In the third scenario: Following the competition method leads to increased participation and creativity.



ROOT CAUSE ANALYSIS (RCA)

One of the major problems faced the project was the security breaches/Viruses to Governance systems which requires us to conduct a comprehensive investigation using the ROOT CAUSE ANALYSIS:

Why?

The security breaches/Viruses attack our systems?

We found that since our project depends on technology and governance systems, so many of our tools are electronic systems, so we have a lot of security breaches.

Why?

These breaches happen to us, and there are examples in similar projects that have the same systems without security breaches?

After investigation, we found that they have protection systems, firewalls.

Why?

We do not have firewalls protection systems?

After checking with the systems and information protection companies, it was found that **because we do not have a cybersecurity department.**

Recommendation:

One of the very important recommendations to the senior management is the necessity to start establishing a department specialized in cyber security to protect the project's systems and to ensure the continuity of the work for these systems to ensure the success of our project.



Chapter 5: Resourcefulness – Negotiations

First Main Subject: Resourcefulness

Distribute the human resources to the functions (11-12-13)

Human resources are defined as the organizational management process that pertains to consulting business, which differs in business management. It is based on one rule and the work is carried out in a system, and its divisions are as follows:

Higher Level:

1- Executive Director: The supreme or executive director of the organization, of the company or institution. He plans, organizes, coordinates and monitors everything related to the company's internal management. He participates in defining its policy and supervises and manages everything related to the work.

2- Project Management Office: It is an entity or department within the organization that directs everything related to the work of the projects and programs of the institution and its management within its powers, and its function is to improve the performance and results of project management, and to assist project managers in achieving project goals so that various and different projects are dealt with as a portfolio. Portfolio) Integratedly managed projects.

Middle Level:

1- Safety and Security Project Manager: is accountable for planning and allocating resources, preparing budgets, monitoring progress, and keeping stakeholders informed throughout the project lifecycle. All of this takes place within the framework of achieving a company's goals and achieving their vision for Safety and Security Project.

2- Afforestation Project Manager: is accountable for planning and allocating resources, preparing budgets, monitoring progress, and keeping stakeholders informed throughout the



project lifecycle. All of this takes place within the framework of achieving a company's goals and achieving their vision for the Afforestation Project and also, reporting to PMO.

- 3- **Solar Energy Project Manager:** is accountable for planning and allocating resources, preparing budgets, monitoring progress, and keeping stakeholders informed throughout the project lifecycle. All of this takes place within the framework of achieving a company's goals and achieving their vision for the Solar Energy Project and also, reporting to PMO.

Lower Level: following some of jobs descriptions under the project:

- 1- **Network engineer:** he handles installing, configuring for devices of Safety and Security Project.
- 2- **Instrument engineer:** he reviews client's technical documentation and requirements, defines engineering requirements, prepares the technical documentation for instrumentation and systems requisitions and performs the technical evaluations, provides technical support to project group.
- 3- **IT-System administrator:** he organizes, installs and supports an organization's computer systems. These include local area networks (LAN), wide area networks (WAN) for the projects.
- 4- **Electrical engineer:** he is applying the principles of electricity, electronics, and electromagnetism for Solar energy projects including installing, testing and operation. Also, he performed risk assessments and ensured compliance with safety standards and electrical engineering codes.
- 5- **Supervisor:** he is supervising all works related to the Afforestation Project and making sure that all foremen follow instructions and using project materials.
- 6- **Foreman:** They plant trees according to the work mechanism and the requirements and materials for the Afforestation project and they work to ensure the productivity of daily operations.



Analyze the influence of conducting the Crashing and Fast-tracking process

Project management approaches the deadline then we analyze it with the project manager, also the team is certain they will not be able to achieve the project objectives according to the current schedule. Therefore, there are some techniques used, which are Crashing and Fast Tracking.

The Crashing:

It involves adding or modifying more physical and human resources to critical path activities to shorten the project duration without changing the project scope.

- a. May increase risks.
- b. May save and reduce project schedule time to increase costs, but it always leads to an increase in the number of resources.
- c. May include resources such as work on the weekend, over time to meet project schedule constraints, but this results in team fatigue.

Example: when we delay installing solar energy for smart traffic signals, we can contract with a temporary company to increase the number of employees.

Fast-tracking:

It involves compressing the project schedule by rearranging the project schedule and changing the relationship of activities on the critical path from the end to the beginning or by adding a delay to the activities to perform the activities in parallel.

- a. overlap with project phases; For example, stage 2 can start before stage 1 is completed.
- b. The interconnections between the stages must be properly managed to avoid risks and rework.
- c. Uses planned resources.
- d. Saves time but it will cause rework and increase project cost and risk.

Example: Here we can create a control room and install a camera at the same time to Fast-tracking.



Second Main Subject: Negotiation

General Rules for Negotiation Process

Negotiation Skills:

is a set of features that allow two or more parties to reach a settlement on a dispute.

The most important negotiating skills:

- Effective communication
- Persuasion skill
- Planning skill
- Strategic thinking
- Teamwork and cooperation

The most important rules of negotiation:

- The first offer is not accepted due to other offers
- **Win-Win** situation These are the best rules because of the possibility of dealing with the other party again and the importance of thinking about the future as a gain and making negotiations successful on both sides and meeting the needs of two parties.
- Ambiguity and flexibility be mysterious, be flexible, change the way and method negotiated to make your strategy unexpected and not static.
- Study the culture of the other party well to avoid loss or any misunderstanding.
- Leave the points of contention to the end of the meeting to be flexible during negotiations to notify the other party that it is not the only choice
- Do not use the word I negotiate because it does not matter during negotiation.

Some negotiating methods:

- The good person & the bad person have a good side that is biased to win negotiations and not lose by sneezing the bad party.



- The new face when negotiating with the same group can take someone new who prefers to be in the highest position so that there is a chance to negotiate a new job.
- Emoticon passion weapon, through which feelings and weaknesses of the other party are used, but the points must be known excellently not to be exploited against you and this method is considered dishonest by negotiation.

Tow Negotiation Plans (14-15)

Scenario 1:

Regarding buying needed hard drives for security equipment.

Budget: \$50000.

Goal: negotiating the suppliers for a fair price below the budget for the needed hard drives.

Place: supplier HQ.

Time (duration): 2 days.

Negotiating team:

- Khaled Nasser - Team leader
- Fahad Muhammad - Negotiator
- Nader Fahad - Support co-negotiator & the coordinator
- Norah Saif - Session registering & writing

The Supplier negotiator: “Hello there! How are you today?”

Fahad Muhammad: “Hi! Thank you. So, I work in a smart neighborhood management team and we are looking for an external hard drive that can handle huge multimedia file transfers like camera feeds, saves and backups, sometimes multiple times per day, with little downtime. We use a lot of security equipment.



It needs to have no disconnections due to very important security information and we're hoping for one that's portable since we need it for multiple places. For a contract for 5 years including yearly maintenance."

The Supplier negotiator: "Thank you for giving me your specific needs! We have what you're looking for. Just for further information, how much storage are you looking for?"

Fahad Muhammad: "we're looking for about 1000 TB minimum.

It's less about the number of files and more how much it can hold at a time, sometimes we need to switch between computers and equipment."

The Supplier negotiator: "That's helpful! Let me take you to our options. These two that we have here will be your best bet, they have 500TB of storage, USB 3 and thunderbolt ports, 5400 rpm, and will run you around \$50000. Most companies who come here and buy these do a lot of video processing, saving, super processing speed and work with large scale multimedia files and a 3 years free maintenance included, which it seems like you need."

Fahad Muhammad: "we're looking for about 3 hard drives minimum.

We are prepared to negotiate the price for \$40000 each."

The Supplier negotiator: "Sorry but that's too low, we are prepared to sell for \$45000!."

Fahad Muhammad:" Let me have a close discussion with my managers and get back to you tomorrow. Thanks!"

The Supplier negotiator: "That is fine tomorrow we will meet again at 12pm at the same place."



Fahad Muhammad:” we are prepared to buy the needed hard drives for the price you suggested yesterday!, the procurements team will contact you for the payments, let us close the deal thank you for your time”

Win-win approach and was successful to have the buy below the budget!

Scenario 2:

Regarding finding a contractor & buying needed construction equipment for the Creation of a control room.

Budget: \$100000.

Goal: negotiating the suppliers & construction company for a fair price below the budget for the needed equipment and contractors.

Place: Our company’s HQ.

Time (duration): 3 days.

Negotiating team:

- Sarah Sultan - Team leader
- Sami Muhammad - Negotiator
- Muhammad Ahmad - Support co-negotiator & the coordinator
- Faten Saeed - Session registering & writing

Sarah Sultan: “Hi! My business just recently had a contract end with our supplier for [construction company LLC] and we’re hoping to begin a new one within the next few days.”

The Supplier negotiator:“It’s good to meet you all! We can definitely help you out here. Can I ask what your specific needs are so We can answer any questions?”

Sarah Sultan: “Yes! We have a fairly large list of citizens, around 5000, so we need a [new security room] to provide them with what they need on a weekly basis. Our last supplier was



great with their [quarterly maintenance], but we always wished that we had [contractors to build quickly and come inspect each month]. I know that this is a bit of a tight time frame, but we're really hoping we can make something work!"

The Supplier negotiator: "I understand the time constraints! While it is a bit of a quick turnaround, I think we can make it happen. We specifically [have a great contract packages], which sounds like what you're looking for.

Our rates are [\$110000-\$170000] yearly contracts including the construction of the security rooms you want!], and we bill on a monthly basis. As far as getting started, we usually need about a 3-week turnaround, but we may be able to get started sooner with an additional [\$10000 advance] for the first month since we'll be getting the ball rolling faster than normal. How does that sound?"

Sarah Sultan: "let us discuss it with our managers and get back to you after 2 days

Sounds good ?"

The Supplier negotiator: "I understand! We will be waiting for your reply! Thank you."

Sarah Sultan: "email sent to the construction negotiator regarding the decision!

We are ready to begin the process due to our tight schedule!. Please refer to our procurement team to finalize the payments, thank you!"

The Supplier negotiator: "I understand! We will begin the process, pleasure doing business with you! Thank you."

Lose approach - was not successful due the buy above the budget!



Chapter 6: Project Design – Requirements and Objectives

First Main Subject: Project Design

Identify the triple constraint of the project:



Figure 6: Triple Constraint of the Project

The triple constraint theory, also called the Iron Triangle in project management, defines the three elements (and their variations) as follows: Scope, Time, Cost.

Those constraints are threefold:

- 1) Cost: the financial constraints of a project, also known as the project budget.
- 2) Scope: the tasks required to fulfill the project's goals.
- 3) Time: the schedule for the project to reach completion.

It's important to know what the triple constraint is because these are the boundaries that every project has to work within in order to be successfully completed. It's very difficult to make changes to the scope without corresponding changes to schedule and budget. If a project is driven by these metrics, then changes to one of them will change the metrics for all of them.



Most projects have trade-offs and compromises in order to ensure project completion. Using a triple constraint can help project managers visualize the trade-offs to owners and other stakeholders. Being able to see what exactly has to budge in order to make changes can help the stakeholders come to a consensus on the necessity of the change.

Using a project management platform can be a quick and easy way to keep track of the scope, budget, and schedule. Being able to quickly check the current numbers against projected numbers and the estimates will help improve estimates and identify potential issues.

When we applied it on the project?

Any change in the time, such as removal of sub-tasks, shortening in the duration of the task, or increase, will directly affect the constraints. because, the change may require a change in the cost. Also, when adjustments to the scope such as adding or deleting, we need to observe the quality of the three constraints.

List of the Project success factors (16-17)

There are many factors that effect on the success projects and we choose five factors as the following:

1. Agree on the project goals: Make sure there is agreement with management, project sponsors, and other stakeholders on the purpose and goals of the project. What problem will the project solve? What is the desired end result? What need will the project fill? Goals should be specific and measurable. Clear measurable goals will help define the project scope.
2. Develop clearly defined plans with assigned responsibilities and accountabilities: Developing a plan is more than just entering the tasks into a software application. All the deliverables need to be defined along with the necessary tasks to produce them and any associated risks. Responsibilities should be assigned to the tasks and deliverables with appropriate due dates and accountabilities.



The planning process should also include risk management activities and communication requirements. Developing the project schedule is only a part of the planning process.

3. Manage the project scope effectively: The project scope is defined in the goal setting, and planning stages of a project. It would be nice if the scope never changed, but this is the real world! The project manager must always be on the alert for changes to the scope and effectively manage those changes.

- Are the changes really necessary for project success or just nice to have?
- What effect will the changes have on the budget and the schedule?
- Has everyone agreed that the change must be done?
- How are the changes tracked?

Managing the scope is one of the more challenging parts of managing projects.

4. Cultivate constant effective communications: Determine the communication channels needed to inform the relevant stakeholders of the progress of the project. Management and project sponsors may want regular status reports or only the highlights and the exceptions. Suppliers, clients and/or customers may need statements of work, contracts, and progress reviews. The project team will need task assignments and regular briefings. The frequency and types of communication for each channel should be defined and managed. Incorporate this communication plan into the project plan and then communicate, communicate, communicate! Many projects fail because of poor communications.

5. Make sure you have management support: These ties back to agreeing on clear project goals. Management must agree that the project is important, will add value to the business, or solve a pressing problem. If management does not see the value of the project, they will be reluctant to support it. If management support is missing, people and funding resources may not be available for the project. If an organization has a multitude of projects, management support may be limited



to only those keys to the business success. Lack of management support is a major reason for project failures.

Develop and Identify Work Breakdown Structure

A Work Breakdown Structure (WBS) is a management tool that helps us to identify the top-level project deliverables and to systematically decompose the deliverables in tasks and activities. This tool helps us to manage and organize all project activities.

This WBS will be used as a basis to plan, estimate and control a project.

The main points are: Task, Outputs deliverables & Time-Cost

No	Type of task	Description of task	Outputs deliverables	Work Package	Dead-line
1	Main Task	Enhancing the security level in the neighborhood	Create a security system & Reduce crimes rate around 70%.	(100) security surveillance cameras 570,000. SR	24 months
1.1	Sub-task	location planning	Choosing the location of the cameras to avoid blind spots	50,000 SR.	1 month
1.2	Sub-task	Buying cameras and other supplies	--	200,000 SR.	1 month
1.3	Sub-task	Create a control room	For monitoring and control	150,000 SR.	10 months
1.4	Sub-task	Camera installation	--	150,000 SR.	9 months
1.5	Sub-task	Integration	Ensure that there are no connection problems	15,000 SR.	1.5 months
1.6	Sub-task	Tests	Ensure that the system is working 100%	5,000 SR.	1.5 months
2	Main Task	Achieving the level of road safety	reducing accident rate around 60%.	installing (20) smart traffic lights (300,000) SR.	17 months
2.1	Sub-task	location planning	Choosing the location of the cameras to avoid blind spots	40,000 SR	1 months
2.2	Sub-task	Buying (20) smart traffic lights	--	80,000 SR.	1 month



2.3	Sub-task	installing (20) smart traffic lights	--	50,000 SR.	7 months
2.4	Sub-task	Integration with control room	For monitoring and control	20,000 SR.	3 months
2.5	Sub-task	installing traffic boards	to facilitate movement	100,000 SR.	4 months
2.6	Sub-task	Tests	Ensure that the system is working 100%	10,000 SR.	1 month
3	Main Task	using renewable energy	reducing electricity operational costs around 50%	installing (20) solar energy for smart traffic signals 500,000 SR	8 months
3.1	Sub-task	Buying (20) solar energy for smart traffic signals	--	400,000 SR.	1 months
3.2	Sub-task	Installing (20) solar energy for smart traffic signals	--	90,000 SR	6 months
3.3	Sub-task	Tests	Ensure that the system is working 100%	10,000 SR	1 months
4	Main Task	Enhance Environment	reduce pollution by 30%, and decreasing the temperature by 10%	planting (150,000) trees (1,630,000) SR.	24 months
4.1	Sub-task	Find a contractor	Planting 150.000 trees & Taking care of the green spaces for 5 Years	--	2 months
4.2	Sub-task	Handing over the site to the contractor	--	--	1 month
4.3	Sub-task	Supervising the contractor	--	--	21 months

Table15: WBS

Second Main Subject: Requirements and Objectives

Requirement Traceability Matrix

A tool used in project management to track the compatibility of final results with basic requirements. Setting up a requirement-tracking matrix requires clearly and accurately identifying the requirement, and then selecting elements that are entered to follow the status and information of the requirement during the project implementation.



RTM is a feature that gives the possibility of tracking requirements to determine both the source of the requirements as well as all other life-cycle artifacts such as tests, use cases and project planning. To document these complex links clearly, a document called a requirement tracking matrix is used to accurately map relationships between requirements, test cases and defects.

Using RTM with its features well, it gives ease in conducting a graphical analysis of traceability and verifying that all requirements are met by verifying the validity of the corresponding test cases.

Requirement 1 data foundationr1	Requirement 2 Network structure	Requirement 3 Securities and safety and continues care	Requirement 4 Modular infrastructure	Requirement 5 Quality life levels	Requirement 6 IT & Transportation	
×						Test case 1# open data
	×					Test case #2 network efficiency 2
				×		Test case #3 safe life and personal emergency response
			×			Test case 4# real time with communication by friends
				×		Test case #5 air pollution5
		×				Test case #6 public transportation
					×	Test case 7

Table16: Traceability Matrix



Methods used in requirements collection (18-19-20)

Requirement collection is the act of generating a list of requirements to define what a project is about and its goal. The following table shows different types of methods that are used to collect the requirements.

Requirements Collection Methods		
#	Method	About
1	Brainstorming	Brainstorming is a common technique used early in a project because it often acts as a starting point
2	Survey	Offering a survey or questionnaire allows you to collect information from many people in a relatively short amount of time
3	Requirement workshop	Requirement workshops are a great way to gather information and as a facilitator, it is important to be prepared for the session to go well
4	Identify the relevant stakeholders	Once the relevant stakeholders are identified, the appropriate level of their involvement in process activities is planned
5	Prioritize the requirements	The process of managing the relative importance and urgency of different requirements to cope with the resources of the project

Table17: methods of requirements collection

Develop the heretical structure of the objectives of the project

For a project to be successful, all levels of management, along with members of the project team, must have clearly defined goals. According to Robert Wicker, a project management consultant, these goals can be organized into a project hierarchy based on different management levels. This hierarchy can be used as a communication tool to keep everyone working towards the same goals.

The goal of senior management:

Standard management objectives are the first level in the project hierarchy. Within this level, broad and deep goals are defined within the organization. At this level, the main concern is only the first



and primary objective. For example, the project aims to establish a smart neighborhood with a low crime rate, the main goal is to establish a high-quality monitoring system.

Strategic objective:

Strategic objectives are the next level in the project hierarchy. Within this level there are complementary objectives that support the primary objective of senior management. In essence, strategic goals are individual components that, when put together, will make the top management's goal successful. When compared to the levels of management within a company, strategic objectives will cover the middle ranks of the organization. Using the same example of the Al-Marakia system, installing 100 surveillance cameras would be a strategic goal.

Project Objective:

Project objectives are the next level in the project hierarchy. Objectives that are directly related to the project's outputs - or the resulting goods or services - fall within this level. The level of project objectives corresponds to the operational or operational levels of management. Think of this level as including the things that must happen in order for the strategic objectives to be successful. Using the afforestation example, the project goal will be to create a clean environment by planting 150.000 trees.

Input Target:

The objectives of the inputs also fall within the operational level of the management. Think of the input goals as the resources the project needs to be successful. For example, in setting up a smart neighborhood, land, labor, experience and contracts are all included in the inputs. Basically, none of the other goals or objectives will be achieved without these inputs.



Chapter 7: Scope – Time – Quality

First Main Subject: Scope

Identify the Scope of Statement

Scope of project is establishing and transforming the traditional neighborhood into smart neighborhood by targeting three main axes (safety, solar energy and the environment) by depending on the limits of the projects that are accomplished within Two years.

Develop, Identify and Explain the Scope Creeping (21-22-23)

Scope creep (sometimes known as “requirement creep” or even “feature creep”) refers to how a project’s requirements tend to increase over a project lifecycle.

Causes of scope creep:

- 1) Lack of a clear and detailed scope
- 2) Weak leadership
- 3) Differing stakeholder opinions
- 4) Not agreeing on how to handle change

There are numerous reasons why the scope of a project changes. Small changes in the requirements eventually snowball into new features. Another reason can be the change in the management of the clients’ company. An example of scope creep is that there are times when clients do not explain their vision properly which may lead to the project manager failing to specify the project scope properly.

An excellent example of a project scope creep is a significant delay in completing a project due to clients’ consistent change requests, lack of resources or site selection.

The root cause of such a scope creep is making too many changes on a project, causing unseen delays. The best way of managing it is by either saying ‘no’ to unnecessary changes or agreeing on how to handle last-minute change requests at the beginning of the project.



Product Analysis Department (24)

Product management can be difficult to define. This is because its work varies from company to company and the actual scope of product management work can be very wide. This is also because it is unlike any traditional role or field most people are familiar with. But in general, product management, as the name indicates, is all about managing a product or the timeline of a product, managing the entire product lifecycle, from idea to development to its marketing and sales, it all includes product management. Product management is a very critical discipline that has gained in importance over the past few years in startups and corporates alike.

Product management is a multidisciplinary role that cuts across different teams in a company to get the best possible product in the market. Product management has evolved out of the need to have people who can take charge of various products and their lifecycle, and as start-ups have grown in size there has been a growing feeling that the development engineering team was not enough to understand the customer's needs and customer pain points. While other teams also failed to see the bigger picture of the product. What was required at the time was to have a CEO for every product and that's how product management evolved. It quickly became apparent that creating, developing and communicating great products to a customer requires great product leadership and that comes with the right business acumen and a deep understanding of technology and user experience.

Elements of product management:

Ideas management:

This is the stage where a new product or new features of the product are brainstormed, researched and evaluated. These ideas can come from inside and outside the company. These ideas are incorporated into the product file for further development.



Draw a roadmap:

A product roadmap is a tool that tells us what the product will be like in the future. The roadmap is the path that the product must follow to achieve the goals that have been set for it. When defining the product roadmap, the strategy and long-term vision of the product are taken into account. The roadmap gives an idea of what the product is currently in, where it should become, and what needs to be done to get to that point.

Define the priorities:

There is a fixed timeline and it seems that the features that will be incorporated into the product never end. This is why prioritization is an essential part of product management. It should be clear what needs to be built and when it should be built to obtain the maximum possible commercial value.

Specification details:

When the product idea is converted into a document or file that contains all customer requirements in detail, then the product is already ready to be built.

Product Design:

Customers' pain points are dealt with by finding specific solutions. These solutions need to be seen and dealt with in a certain way. Product design takes care of this by creating detailed product models and diagrams. It also takes into account who the users of this product are, how they interact with it, and how the product affects and interacts with it. Technical problems that may occur during product development and delivery are also carefully considered and measures taken at that time are planned accordingly.



Product Receipt:

The successful leadership of the product means that the product reaches the customer in a smooth way, with the help of the various teams in the company from development, marketing, design, sales and other teams, taking into account that the product quality is high according to the specifications that have been developed in advance. Even after sales support falls within the scope of product management.

Product Test:

Experiments such as A/B testing are conducted to test whether what is provided to users is of value to them. This is an ongoing process and helps to improve the product. Analytics and metrics help understand how users interact with the product and if there are any areas for improvement.

Product Marketing:

There is a separate product marketing team in most companies, but often there is an overview of how to approach marketing, especially planning how to reach the market and deliver products, this comes within the field of product management. Product marketing is closer to customers and market than product management is closer to product handling but since product management has a very broad scope of work, sometimes some product managers have to do both.

Customer Reviews:

Product management relies heavily on customer feedback at almost every stage and customer feedback helps in improving and validating proposed product features. It helps to understand whether the approach is really appropriate for the customer and whether the maximum possible business value will be obtained. The notes also help discover new pain points that were not found previously.



Second Main Subject: Time

The Functions List or the Activities included in each work package in WBS

WBS	Description of task	Duration	Start of mission	End of mission
1	Enhancing the security level in the neighborhood	24 Months	1/1/2023	31/12/2024
1.1	location planning	1 Month	1/1/2023	31/1/2023
1.2	Buying cameras and other supplies	1 Month	1/2/2023	28/2/2023
1.3	Create a control room	10 Months	1/3/2023	31/12/2023
1.4	Camera installation	9 Months	1/1/2024	30/9/2024
1.5	Integration	1.5 Month	1/10/2024	15/11/2024
1.6	Tests	1.5 Month	16/11/2024	31/12/2024
2	Achieving the level of road safety	17 Months	1/1/2023	31/5/2024
2.1	location planning	1 Month	1/1/2023	31/1/2023
2.2	Buying (20) smart traffic lights	1 Month	1/2/2023	28/2/2023
2.3	installing (20) smart traffic lights	7 Months	1/3/2023	30/9/2023
2.4	Integration with control room	3 Months	1/10/2023	31/12/2023
2.5	installing traffic boards	4 Months	1/1/2024	30/4/2024
2.6	Tests	1 Month	1/5/2024	31/5/2024
3	Using Renewable Energy	8 Months	1/9/2023	30/4/2024
3.1	Buying (20) solar energy for smart traffic signals	1 Month	1/9/2023	30/9/2023
3.2	Installing (20) solar energy for smart traffic signals	6Months	1/10/2023	31/3/2024
3.3	Tests	1 Month	1/4/2024	30/4/2024
4	Enhance Environment	24 Months	1/1/2023	31/12/2024
4.1	Find a contractor	2 Months	1/1/2023	28/2/2023
4.2	Handing over the site to the contractor	1 Month	1/3/2023	31/3/2023
4.3	Supervising the contractor	21 Months	1/4/2023	31/12/2024

Table18: List of activities included in each work package in WBS



The Relationships Between the Activities:

Any project includes a set of activities that must be performed to produce deliverables of such a project. These activities should be completed in a certain sequence which can be mandatory or discretionary in service of a defined logic. There are several factors affecting selecting one dependency over another including the nature of activity, application of a specific standard or a specific policy, etc.

In this respect, four types of dependencies can be addressed, and we will basically illustrate and give an example of each dependency:

Finish to Start (FS) Dependency:

It typically means that a successor activity cannot start until a predecessor or current activity has finished. This is the most commonly used relationship in preparing project schedules.

Start to Start (SS) Dependency:

It means that a successor activity cannot start until a predecessor or current activity has started.

Finish to Finish (FF) Dependency:

It means that a successor activity cannot finish until a predecessor or current activity has finished irrespective of the start time of such activity.

Start to Finish (SF) Dependency:

It means that a successor activity "yes, the successor activity" cannot finish until a predecessor or current activity has started. It is a rarely occurring relationship. Accordingly, you cannot probably cite an example of such a relationship in most books tackling the preparation of network diagrams and project time management.

✓ In the Smart District Project, we will adopt the Finish to Start (FS) Dependency.



Logical Diagram of the Project Activities and Identify the Critical Path

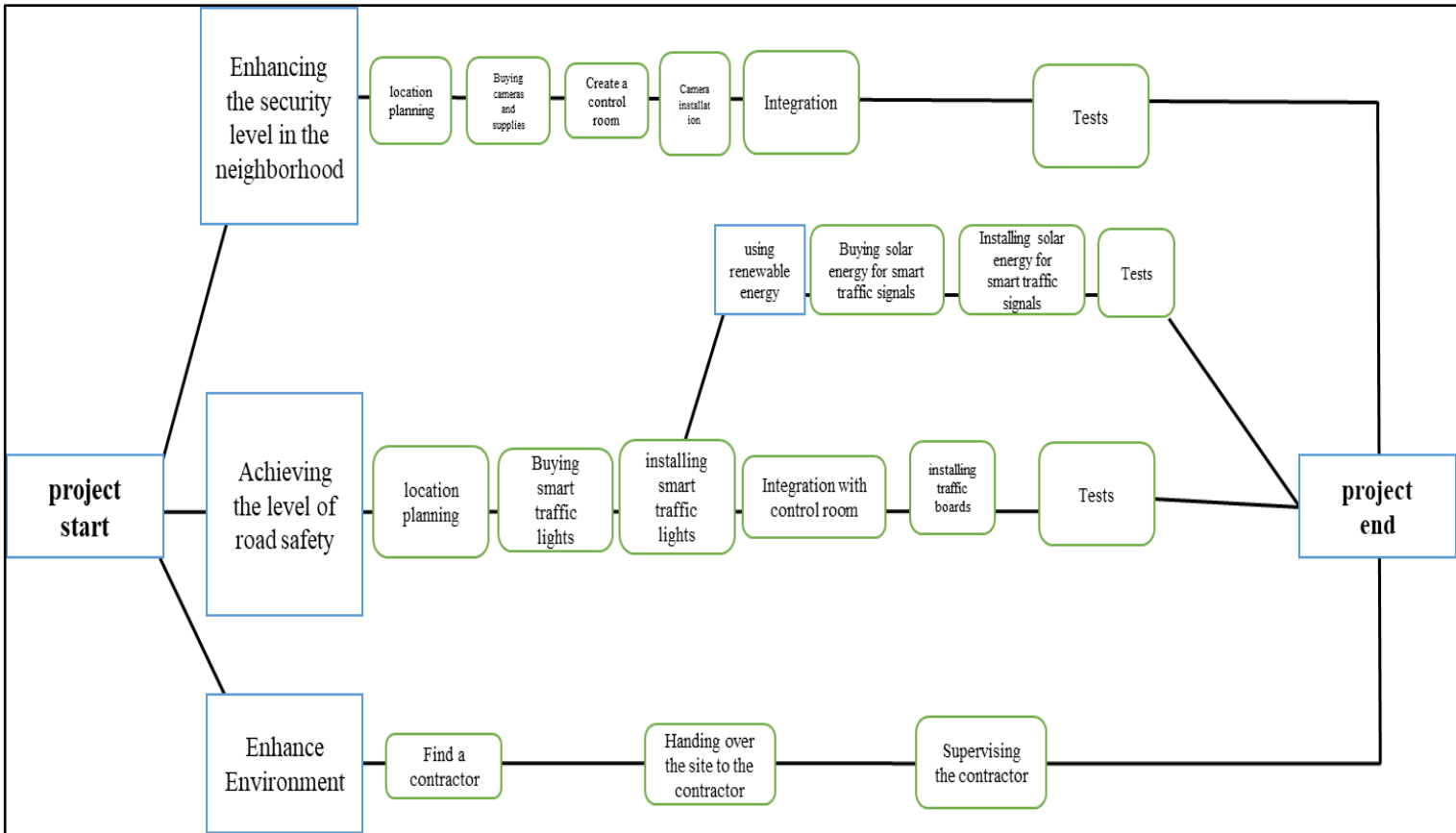


Figure7: logical diagram

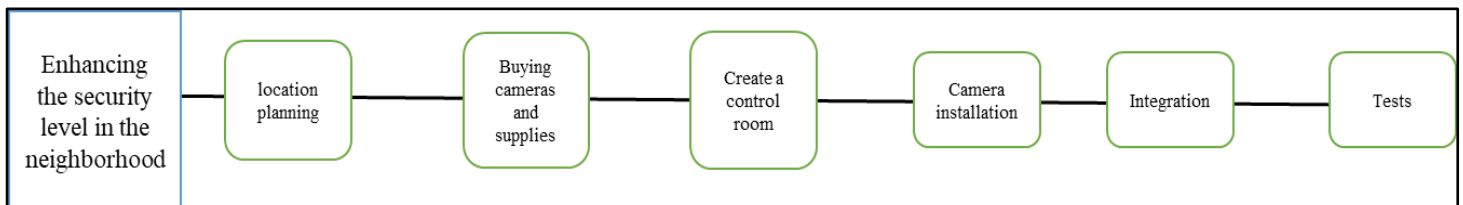


Figure8: Critical diagram

Start/ 1 Jan 2023 , End/ 31 Dec 2024 , Total = 24 months



The Gantt chart and Milestones model

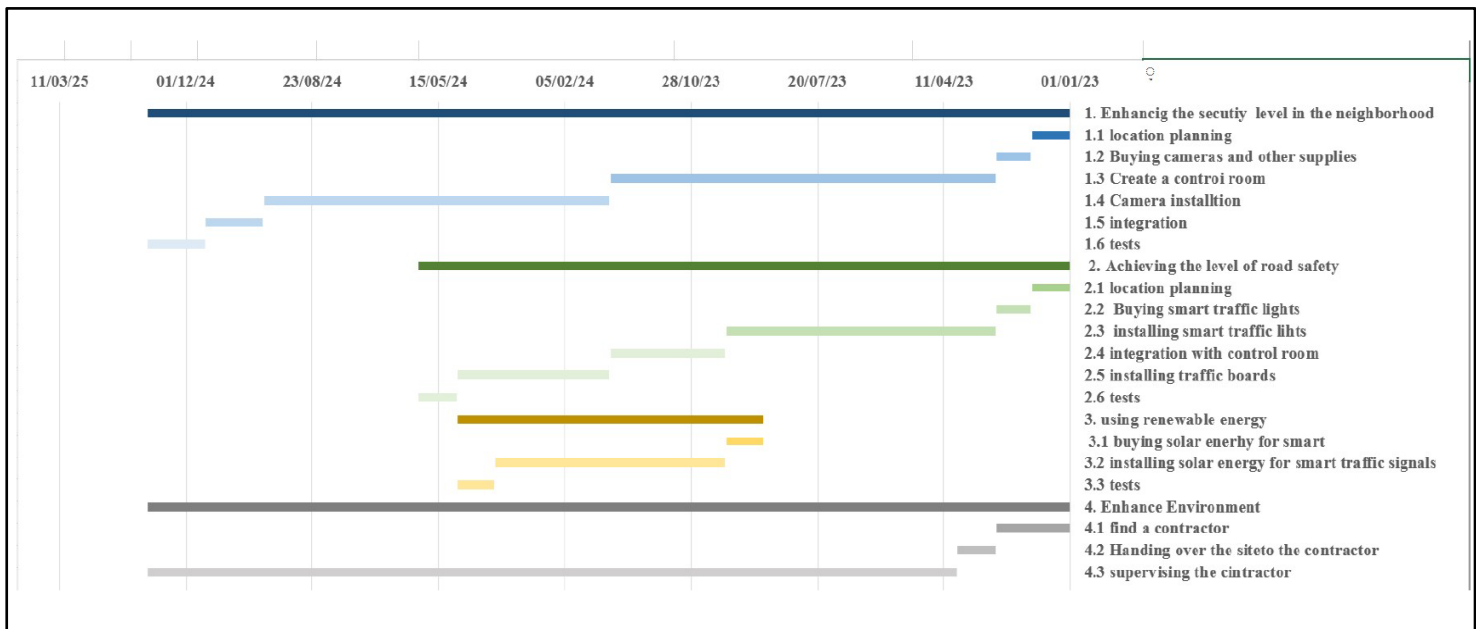


Figure9: Gantt Chart

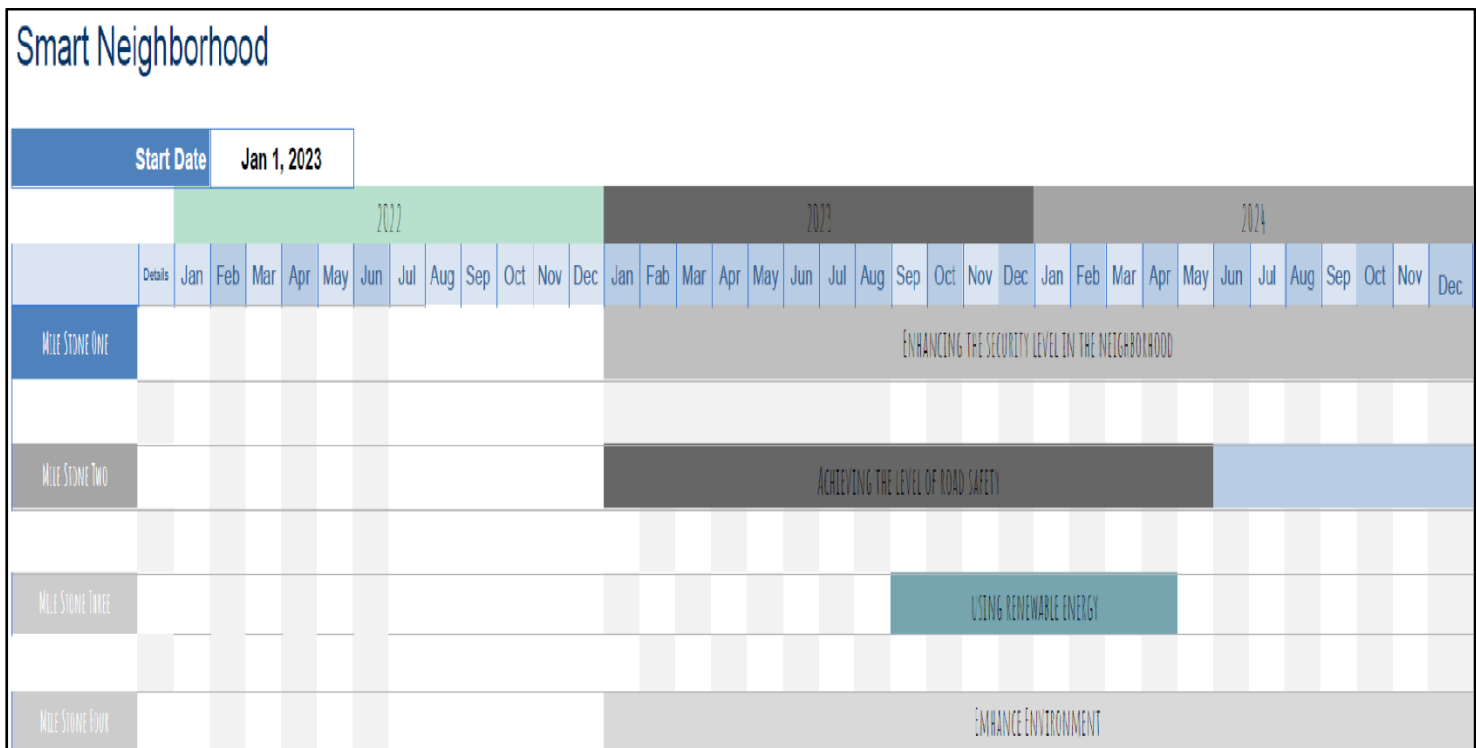


Figure10: Milestones Model



Third Main Subject: Quality

Clarify the Deming Model for Quality (25)

W. Edwards Deming worked as a statistician and researcher during World War II, and in the 1950s, he led efforts to bring statistical thinking and quality control methods to improve business, beginning with the manufacturing industry. Deming's contributions include developing a system of Statistical Quality Control (SQC) and championing the importance of quality in product and production through his philosophies and principles.

Deming's philosophy on achieving quality has helped to form the manufacturing and service industries we see today. Many industries still draw from Deming's work to improve their business models and build cultures focused on continuous improvement.

According to The W. Edwards Deming Institute, Deming's Theory is a system-based management philosophy framework that "represents a holistic approach to leadership and management." Deming outlined what he found to be the managerial changes necessary to improve quality. These changes are illustrated through four main areas as well as a list of 14 principles intended to guide improvement in organizational structure and behavior.

In short, when executed, the framework creates continuous improvement in people and organizations. It gives leaders a roadmap for how to work with teams and organizations as systems, rather than focusing on problems with or actions of the individual people working within silos.

Deming's Theory informs that there is always a solution within the workings of the system. For example, to reprimand a person for a mistake without fixing the system error that allowed the mistake to be made in the first place is an unsustainable business model. The focus should be on system improvement, process improvement, and on the organization working as a whole organism.

And to keep these systems and processes in place and ensure they're followed? That takes management. Deming's Theory takes the idea of managing people and expands it to the idea of managing a larger system, where every piece affects the other, and interrelated parts are viewed as a comprehensive whole.

Deming's Theory is explained via four main parts and 14 principles called the 14 points for total quality management.



The four main parts of the theory:

1. Appreciation for a system. A system cannot be improved or managed by anyone who does not understand the system. A leader must understand all parts and optimize the system as a whole.

2. Knowledge about variation. Mishaps or causes for variation are as a result of the system and systematic processes, and not a result of people or individuals. Knowledge about variation transfers blame away from the person and looks instead at the system to identify flaws in workflow, training, or improvement opportunities.

3. Theory of knowledge. Knowledge, information, and experience work together—knowledge does not mean simply copying provided examples. Leadership and training must be instituted, and continuous thinking, question-asking, and solution development lead to improvement. The PDSA cycle, also created by Deming, is an example of this theory.

The PDSA (Plan, Do, Study, Act) cycles theory is a framework for rapid-testing change on a small scale. In healthcare, PDSA cycles allow for small cycles of change to be implemented, tested, analyzed, and revised before expanding to a larger scale. The PDSA cycles process is effective for change implementation: it's a low-risk method due to small-scale testing and analysis, it allows predictions to be tested reasonably and through data collection, it offers a high potential for buy-in from team members, and it makes change more incremental and therefore more acceptable to organizations.

4. Knowledge of psychology. While this framework focuses on the system, within the system, there are human beings. When leaders understand psychology, they can make decisions that motivate and manage people in order to optimize the system in which they are working.

Even by reading the four main parts of the theory without a very detailed explanation, you can see that Deming's Theory effectively draws focus away from the individual element and focuses instead on improving the systems in which the individuals operate.



The four main points above relate to the list of principles that Deming called the 14 Points for Total Quality Management in his book *Out of the Crisis*. Deming's 14 Points for Management illustrate the points that are to be followed by managers in order to guide organizational practice and behavior. The 14 points in summary are:

01	CREATE PURPOSE FOR IMPROVEMENT	08	DRIVE OUT FEAR
02	ADOPT THE NEW PHILOSOPHY	09	BREAK DOWN SILOS
03	CEASE DEPENDENCE ON INSPECTION TO ACHIEVE QUALITY	10	NO SLOGANS
04	WORK WITH ONE SUPPLIER TO REDUCE COST	11	NO QUOTAS OR NUMERICAL GOALS
05	CONTINUOUS IMPROVEMENT	12	REMOVE ANNUAL RATINGS OR MERIT SYSTEM
06	ON-THE-JOB TRAINING	13	INSTITUTE EDUCATION AND SELF-IMPROVEMENT PROGRAMS
07	LEADERSHIP	14	INVOLVE ALL WORKERS IN THE TRANSFORMATION

Here are the explanations of the 14 points from Deming's book *Out of the Crisis*:

1. Create constancy of purpose toward improvement of product and service, with the aim to become competitive and to stay in business, and to provide jobs.
2. Adopt the new philosophy. We are in a new economic age. Western management must awaken to the challenge, must learn their responsibilities, and take on leadership for change.
3. Cease dependence on inspection to achieve quality. Eliminate the need for inspection on a mass basis by building quality into the product in the first place.
4. End the practice of awarding business on the basis of price tag. Instead, minimize total cost. Move toward a single supplier for any one item, on a long-term relationship of loyalty and trust.
5. Improve constantly and forever the system of production and service, to improve quality and productivity, and thus constantly decrease costs.



6. Institute training on the job.
7. Institute leadership (see point 12 and Chapter 8 in Out of the Crisis). The aim of supervision should be to help people and machines and gadgets to do a better job. Supervision of management is in need of overhaul, as well as supervision of production workers.
8. Drive out fear, so that everyone may work effectively for the company (see Chapter 3).
9. Break down barriers between departments. People in research, design, sales, and production must work as a team, to foresee problems of production and in use that may be encountered with the product or service.
10. Eliminate slogans, exhortations, and targets for the workforce asking for zero defects and new levels of productivity. Such exhortations only create adversarial relationships, as the bulk of the causes of low quality and low productivity belong to the system and thus lie beyond the power of the workforce.
- 11.a. Eliminate work standards (quotas) on the factory floor. Substitute leadership.
b. Eliminate management by objective. Eliminate management by numbers, numerical goals. Substitute leadership.
- 12.a. Remove barriers that rob the hourly worker of his right to pride of workmanship. The responsibility of supervisors must be changed from sheer numbers to quality.
b. Remove barriers that rob people in management and in engineering of their right to pride of workmanship. This means, inter alia, abolishment of the annual or merit rating and of management by objective.
13. Institute a vigorous program of education and self-improvement.
14. Put everybody in the company to work to accomplish the transformation. The transformation is everybody's job.



The SIPOC Model and Ishikawa for One of the Issues of the Project Outputs Regarding security enhancements.

Suppliers	Inputs	Processes	Output	Customers
PMO office	Weak security and lots of robberies in the neighborhood	Enhancing the security level in the neighborhood	Create a full security system and HQ to reduce crime rate within the neighborhood	Environment, health, safety, security management (EHSS Department)
Environment, health, safety, security management (EHSS Department)	Security equipments Missing in the neighborhood	Location planning for security equipments	Choosing the right location for security equipments to be installed for maximum security and avoiding blind spot angles	(Field Engineers & Construction team)
(Field Engineers & Construction team)	Security HQ room Missing in the neighborhood	Creating a control room HQ for security	controlling all security equipments and to maintain functionality in one place	Environment, health, safety, security management (EHSS Department) And (Procurement Department) And (Security Store LLC)
Environment, health, safety, security management (EHSS Department) And (Procurement Department) And (Security Store LLC)	List for all security equipments needed in the neighborhood	Buying cameras and other supplies regarding security enhancement	N/A	(Information Technology management team & Network Engineers)
(Information Technology management team & Network Engineers)	All security equipments needed are ready to be installed	Security equipments installation within the neighborhood	Correct installation to reduce errors and eliminate malfunction	(Information Technology management team & Network Engineers)
(Information Technology management team & Network	All security equipments installed and ready to be	Integration for all security enhancement equipments	Ensuring that there are no connection problems between equipments and security HQ	(Information Technology management team & Network Engineers) And (Quality assurance



Engineers)	integrated			management team)
(Information Technology management team & Network Engineers) And (Quality assurance management team)	All security equipments installed and integrated and ready for testing	Tests for equipments and connection to security HQ	Ensuring that the systems are working 100% for all equipments	

Table19: SIPOC Model

Ishikawa Fishbone diagram:

Regarding security network failures & intrusions.

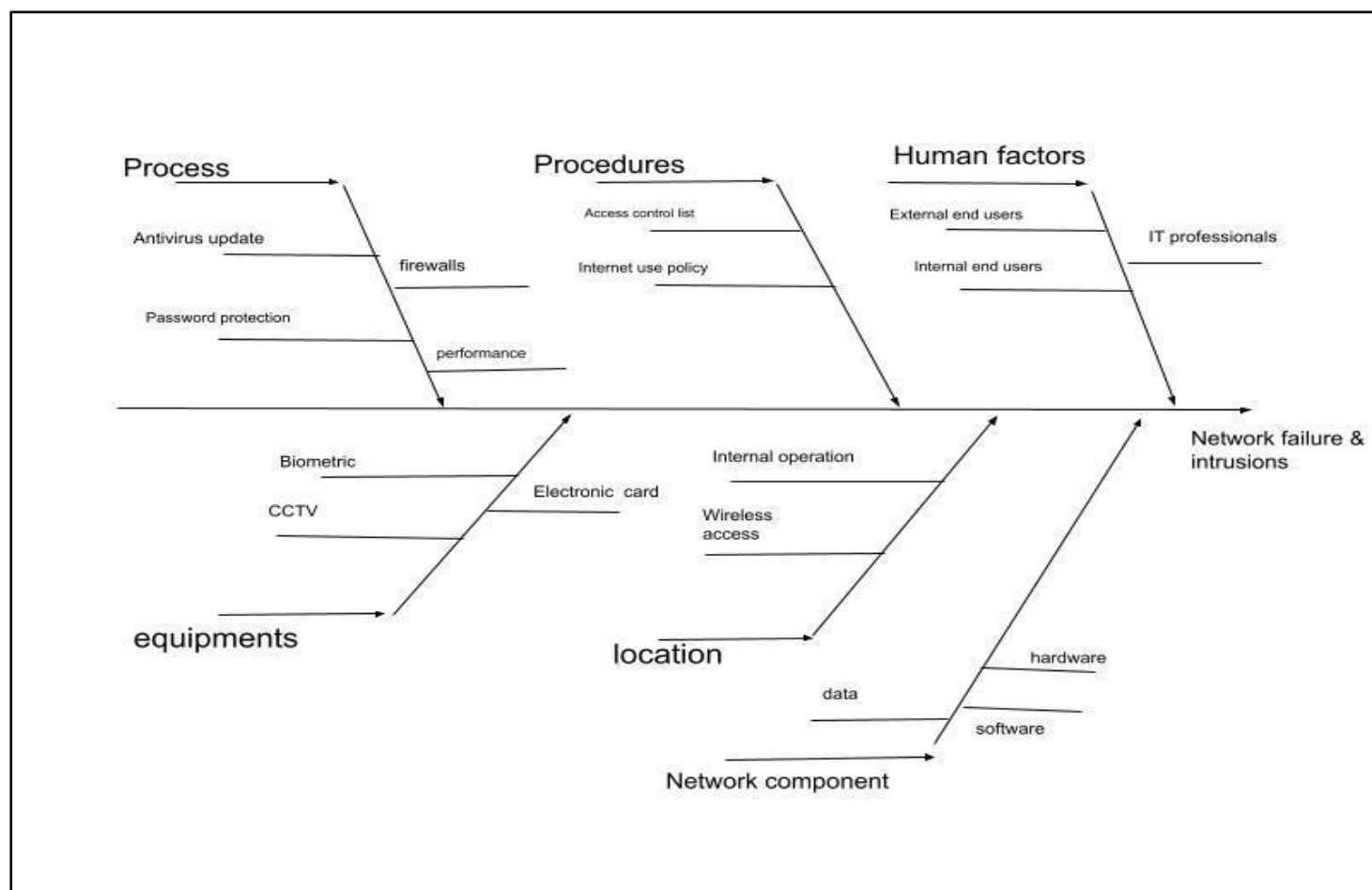


Figure11: Ishikawa Fishbone diagram



Chapter 8: Cost

Main Subject: Cost

Cost Breakdown Structure, and the project balance by WBS:

WBS	Type of task	Description of task	Outputs deliverables	Work Package	Dead- line
1	Main Task	Enhancing the security level in the neighborhood	Create a security system & Reduce crimes rate around 70%.	(100) security surveillance cameras 570,000. SR	24 months
1.1	Sub-task	location planning	Choosing the location of the cameras to avoid blind spots	50,000 SR.	1 month
1.2	Sub-task	Buying cameras and other supplies	--	200,000 SR.	1 month
1.3	Sub-task	Create a control room	For monitoring and control	150,000 SR.	10 months
1.4	Sub-task	Camera installation	--	150,000 SR.	9 months
1.5	Sub-task	Integration	Ensure that there are no connection problems	15,000 SR.	1.5 months
1.6	Sub-task	Tests	Ensure that the system is working 100%	5,000 SR.	1.5 months
2	Main Task	Achieving the level of road safety	reducing accident rate around 60%.	installing (20) smart traffic lights (300,000) SR.	17 months
2.1	Sub-task	location planning	Choosing the location of the cameras to avoid blind spots	40,000 SR	1 month
2.2	Sub-task	Buying (20) smart traffic lights	--	80,000 SR.	1 month
2.3	Sub-task	installing (20) smart traffic lights	--	50,000 SR.	7 months
2.4	Sub-task	Integration with control room	For monitoring and control	20,000 SR.	3 months
2.5	Sub-task	installing traffic boards	to facilitate movement	100,000 SR.	4 months
2.6	Sub-task	Tests	Ensure that the system is working 100%	10,000 SR.	1 month
3	Main Task	using renewable energy	reducing electricity operational costs around 50%	installing (20) solar energy for smart traffic signals 500,000 SR	8 months
3.1	Sub-task	Buying (20) solar energy for smart traffic signals	--	400,000 SR.	1 month
3.2	Sub-task	Installing (20) solar energy for smart traffic signals	--	90,000 SR	6 months
3.3	Sub-task	Tests	Ensure that the system is working 100%	10,000 SR	1 month
4	Main Task	Enhance Environment	reduce pollution by 30%, and decreasing the temperature by 10%	planting (150,000) trees (1,630,000) SR.	24 months
4.1	Sub-task	Find a contractor	Planting 150.000 trees & Taking care of the green spaces for 5 Years	--	2 months
4.2	Sub-task	Handing over the site to the contractor	--	--	1 month
4.3	Sub-task	Supervising the contractor	--	--	21 months
It has been agreed with MMRAH that all employees' salaries well be paid by them for 100 employees					

Table20: Project Budget



- Earned Value of the project after 20% of its term

PV BAC * planned complete% = 990,000.00

EV BAC* Actual complete% = 1,084,000.0

AC actual money spent 4 months = 10640000

CPI EV/AC = 1.018

SPI EV/PV = 1.094

- Earned Value of the project after 50% of its outputs have been completed

PV = 2,455,000.0

EV = 2,877,000.0

AC = 2,760,000.0

CPI = 1.04

SPI = 1.17



Chapter 9: Resource – Procurement – Plan and Control

First Main Subject: Resource

The Concept Resource Leveling and Smoothing (26-27-28)

Resource leveling

Resource leveling is a project management technique that involves resolving overallocation or scheduling conflicts to ensure a project can be completed with the available resources. Resources include the time, materials, or tools needed to complete a project. This will benefit the organization without having to face conflicts and not being able to deliver on time. Resource leveling is considered one of the key elements to resource management in the organization. The purpose of resource leveling is to get the most out of available resources while working within the project's time, cost, and scope constraints.

Depending on the team needs, here are the possible outcomes:

- If the goal is to keep the current project deadline, more resources may need to be made available.
- If the goal is to run the project with currently available resources, the deadline of the project may be extended.

When to use resource leveling

Resource leveling is used when scheduling the production of available resources is limited and needs to be used optimally. prevents resources from being spread too thin while ensuring projects still have what they need to succeed.

Resource leveling Techniques

Critical path is a common type of technique used by project managers when it comes to resource leveling. The critical path represents both the longest and shortest time duration paths in the



network diagram to complete the project. However, apart from the widely used critical path concept, project managers use fast tracking and crashing if things get out of hand.

- **Fast tracking** - This performs critical path tasks. This buys time. The prominent feature of this technique is that although the work is completed for the moment, the possibility of rework is higher.
- **Crashing** - This refers to assigning resources in addition to existing resources to get work done faster, associated with additional costs such as labor, equipment, etc.

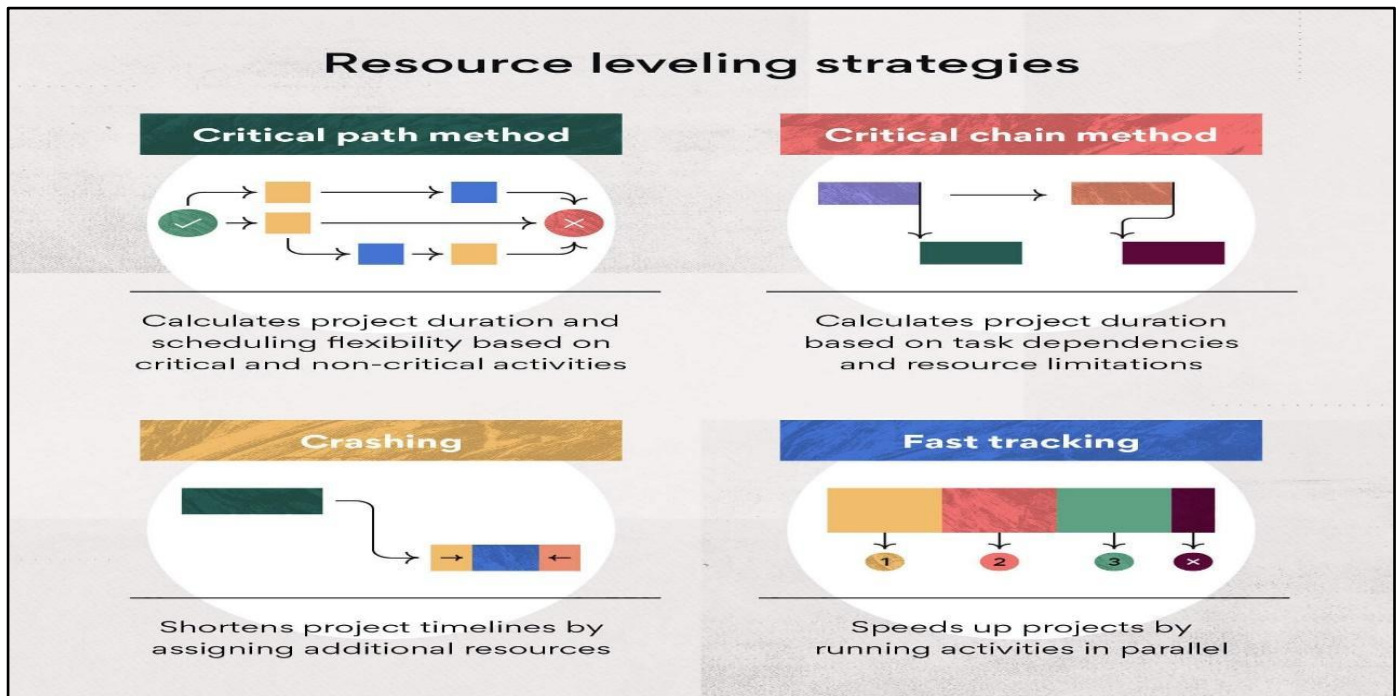


Figure12: Resource Leveling Strategies

Resource smoothing

Resource smoothing is one of the project management tools used in the resource optimization techniques. It is defined as a technique that adjusts the activities of a schedule model so that all requirements for the resources do not go beyond the resource limits already pre-defined during the planning. It is used when the time constraint takes an important priority in project planning. The



objective of this project management tool is to complete the work or activity within the required date and, at the same time, avoiding peaks and troughs or the resource demand.

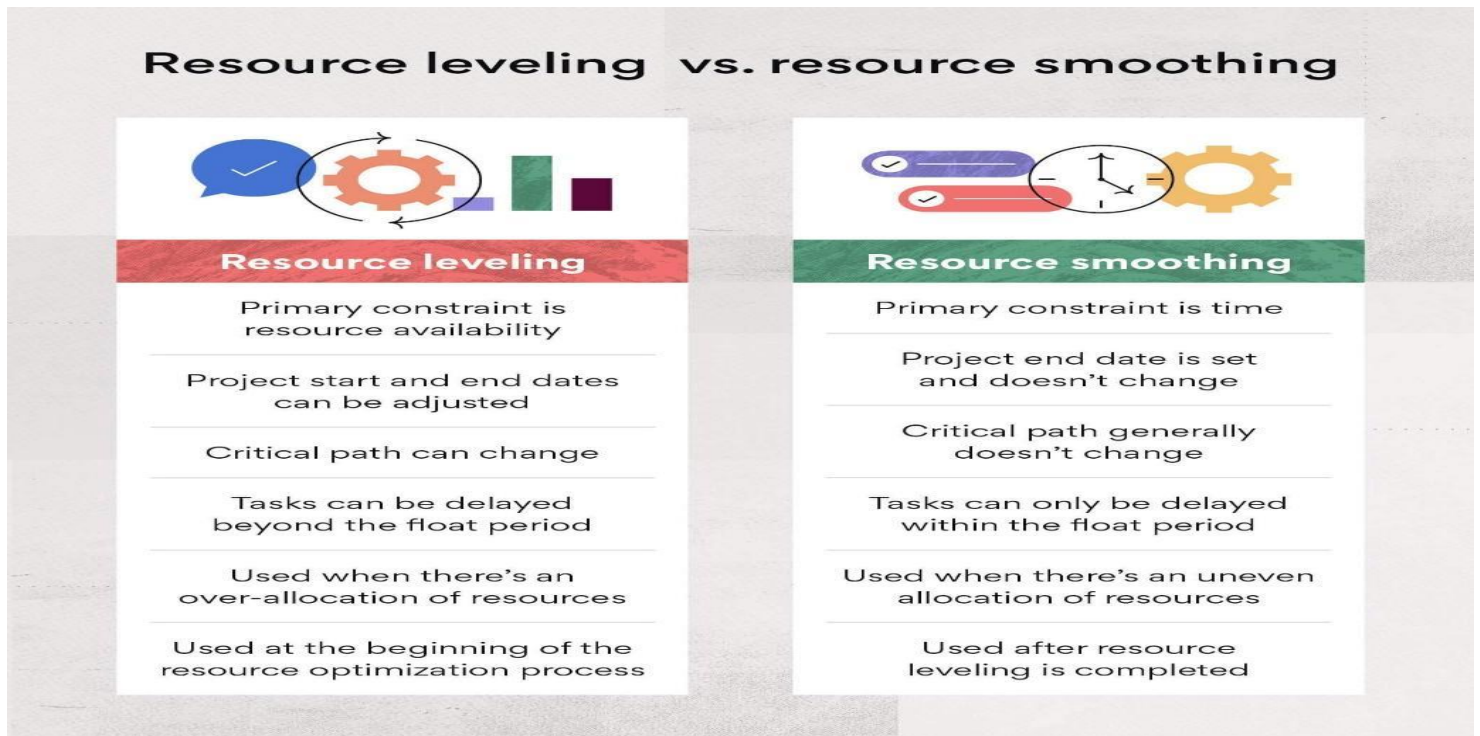


Figure13: Resource Leveling vs. Resource Smoothing



Examples:

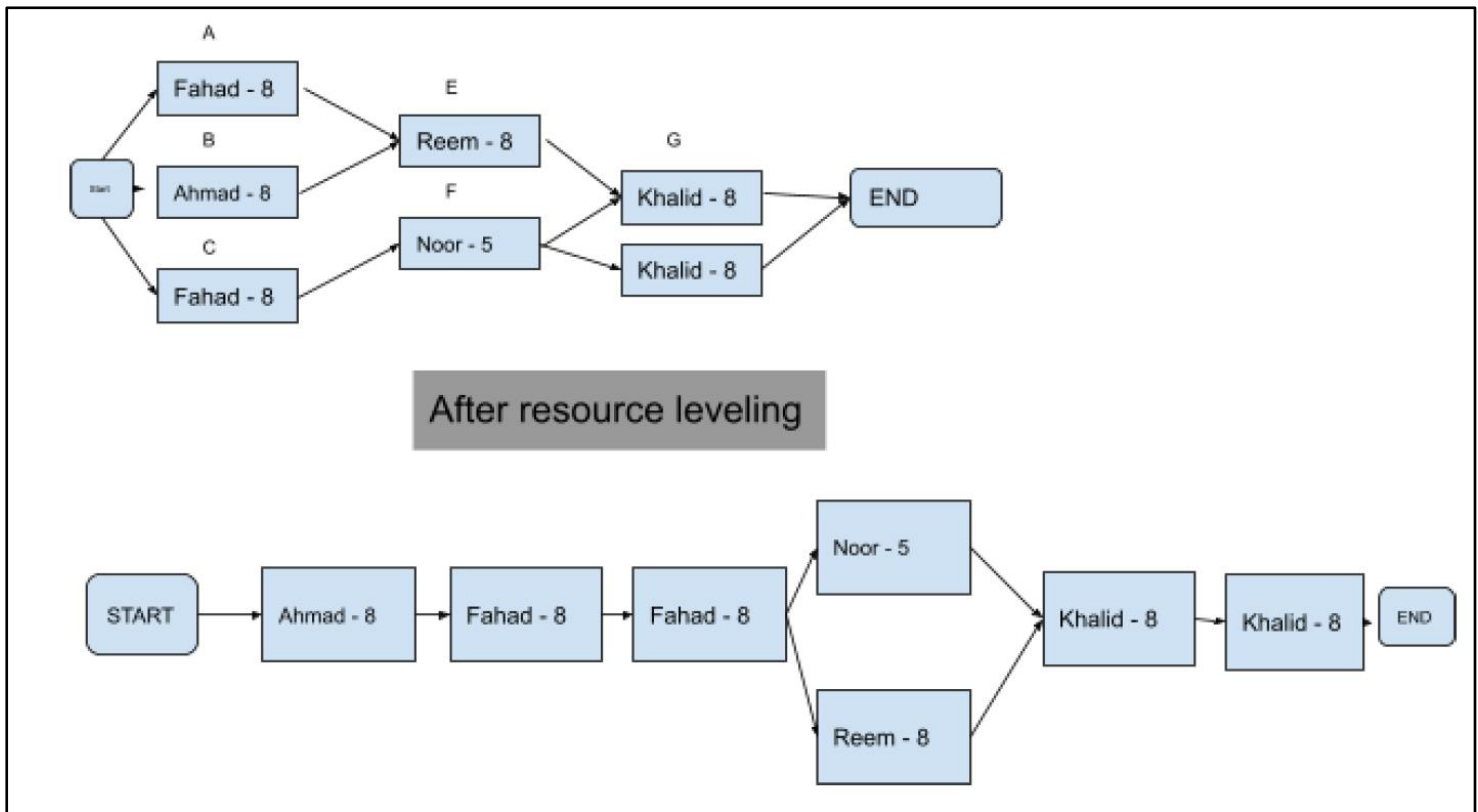


Figure14: Example of Resource Leveling

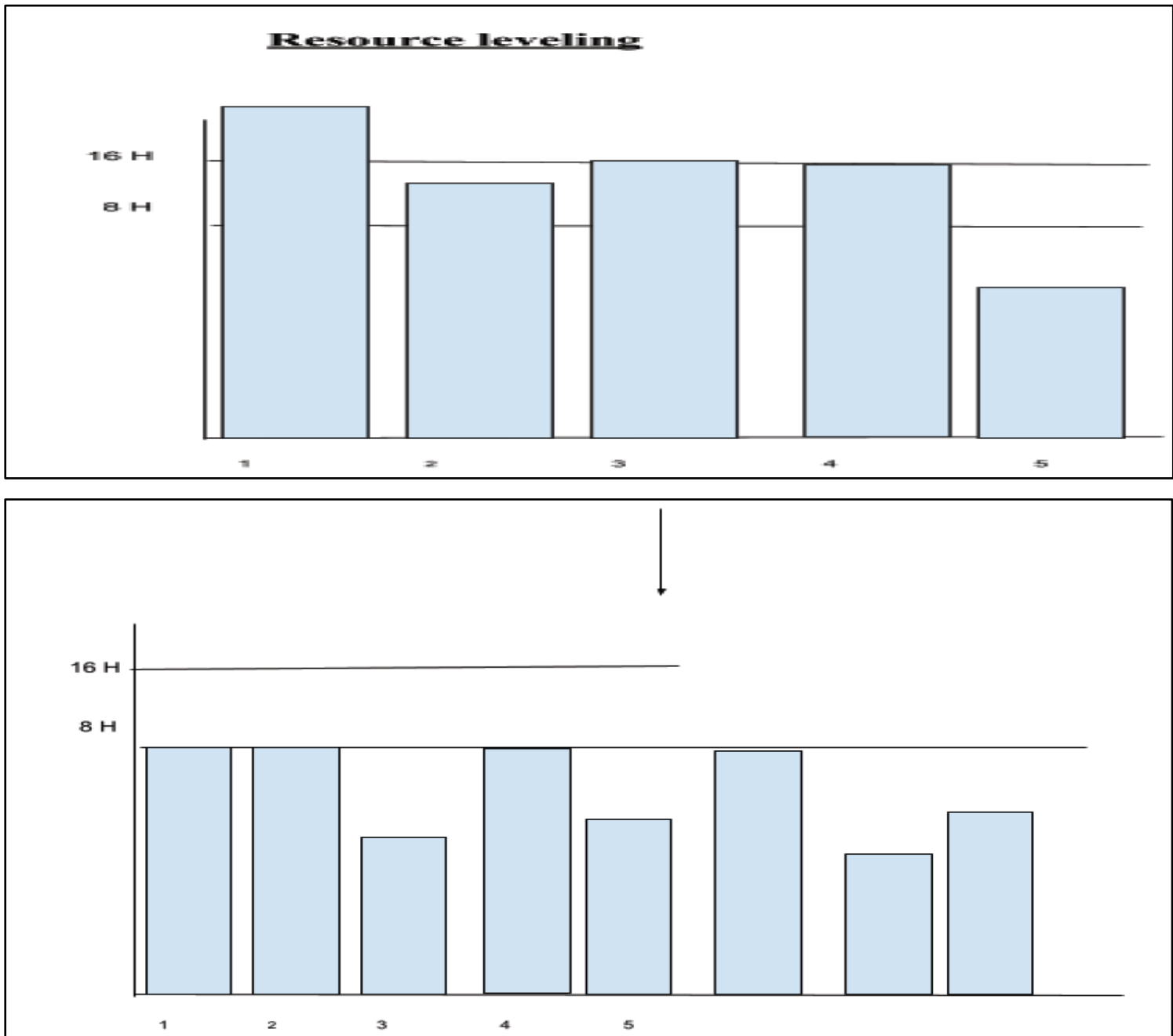


Figure15: Examples of Resource Leveling



Second Main Subject: Procurement

The Procurement Execution Process, and Contractor Selection (29)

The Purchasing Department is defined as the department responsible for purchasing all the company's needs (materials) in a timely manner through tenders or limited practices between suppliers, as well as providing the best possible price for materials and the best payment terms.

The Purchasing Department aims to:

- 1- Providing the company with the materials it needs of the best possible quality and at the right time.
- 2- Ensure that the production process is not disrupted.
- 3- Providing the required materials at the lowest possible prices.
- 4- Maintaining the company's cash flow by providing materials with the best payment terms, in a way that provides the cash needed for the progress of the production process.
- 5- Achieving the best deals by contracting long-term suppliers to ensure the company's competitiveness.
- 6- Reducing the purchase cost by storing the necessary fast-moving materials in the production departments.

Companies must strive to develop their management policy for both purchases and stores because of their great importance to the company in achieving an abundance of costs and then maximizing profits. We will review some proposed developments:

1- How to buy when needed:

It is considered one of the most important ways to develop purchasing management, as this method depends mainly on searching for the best suppliers for a particular item in terms of quality, price, payment terms and making a long-term contract with him that guarantees the flow of this item at the agreed price for a long period of time in the form of small orders, thus ensuring the necessary item flow For the continuity of the production process at the right time and at the same price for a



long period of time in order to ensure increased profits and reduce risks resulting from price fluctuations. Through this method, a schedule is made with the quantities received according to the agreed contract.

2- Centralized and Decentralized Purchasing Method:

This method depends on combining the advantages of centralization in purchasing to the main center and decentralization of the branches, where the head office sets purchasing policies by making contracts with suppliers who supply the basic needs of the company by concluding contracts and setting purchase prices as well as allowing the branches to purchase directly within the limits of specific amounts without the need to return to it in order to meet its emergency needs in a way that does not allow the production process to stop. Through this system, the company can benefit from the prices provided by the centralization of purchasing and contracting, as well as the flexibility provided by the decentralization of purchasing for the branches.

The workflow process for purchase requisition items includes the following steps:

1. The preparer sends the purchase requisition for review. Each item is routed to the auditor who is configured to receive it in the workflow process.
2. The purchasing agent receives a notification. The notification asks the purchasing agent to validate the information in the purchase requisition and purchase requisition lines. When the purchasing agent opens the purchase requisition, all items are visible, but a visual indicator appears showing which items have been sent to the purchasing agent for review. If the requested information is missing, the purchasing agent can add the information or return the purchase requisition line to the preparer to add. When the required information is completed, the purchase requisition line can be moved to the next step in the review process. Purchase requisition lines can be tracked independently of the review process.
3. The requisition items manager approves the purchase requisition items. Approval may be directed to the requesting manager if, for example, the purchase requisition item amount exceeds



the requisition spending item limit. The manager can accept or reject one or both items of the purchase requisition.

4. The director of the Marketing Department reviews the purchase order items for lighting and cameras. The sales manager reviews the purchase requisition line only for the cameras, because this is only the cost to the sales department.

5. The group manager reviews and approves the purchase requisition item for lighting only if the approval of the group manager is required because the amount in the purchase requisition item exceeds the department manager's approval limit, for example. The group manager does not have to approve the camera's purchase requisition line.

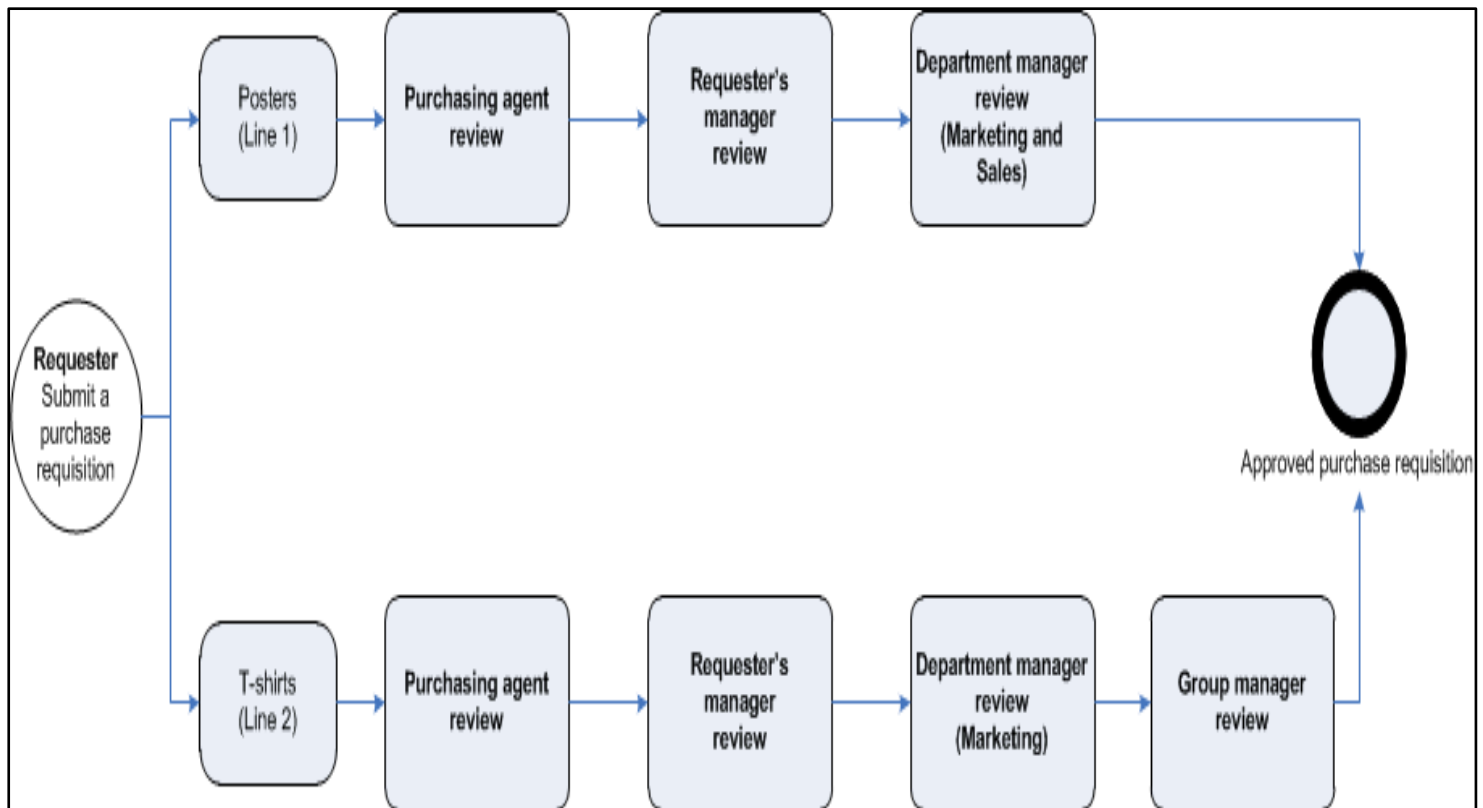


Figure16: Workflow process for purchase requisition



Contractor selection

When selecting contractors, the following should be considered:

1. Industry/Business related experience level
2. Familiarity with the risks in your field
3. Previous health and safety performance records
4. Safety policies, risk assessments and training records
5. Insurance cover - professional indemnity, general liability, workers compensation
6. Methods of communication before and during work
7. Subcontractors and their competencies
8. Supervision requirements
9. Process notifications of problems and incidents.

Factors assisting in choosing a contractor:

- 1- Companies self-registration: Whether the organization in which you work is technically advanced, or simple, the contractors' marketing representatives will often communicate via email, phone, or perhaps registration if the technical system allows self-registration. And here the system must be intelligent so that the registered company is required to choose the appropriate classification corresponding to the services or materials it provides. And if the communication is as simple as the phone or email, then there is no less than a classification list in which these contractors are registered, to refer to it when needed.
- 2- Nominations of the departments benefiting from the contract: Those who work in the contracts departments do not necessarily have to be familiar with the department they will serve, "even if the presence of experience is the origin," especially as it may serve different sectors such as projects, maintenance, or services and all of them. There are many sections under it, but also specialized. Therefore, sometimes the beneficiary department of the contract, such as the Department of



Electricity or Information Technology, is more familiar with the sector and has information about new names for some contractors who may be included among the potential contractors.

3- Manufacturers' nominations: If there is a need to establish a maintenance contract for a specific machine or system, the manufacturer often has local contractors who are approved and licensed to maintain their machines and systems. You must refer to the manufacturers either by communicating with them and requesting a list of their representatives, and perhaps some publish it on their websites.

4- Peer nominations from similar organizations: If you are in an organization specializing in construction, or oil, your counterparts from organizations in the same field may have preceded you with similar work to what you are about now, so it is smart to start from where they left off, and accordingly, maintaining a relationship A healthy exchange of experiences will definitely benefit you in your work, as a small information may make you close to the best contractor, or it may pay for you.

		Requirement Score				
Criteria	Weight	A	B	C	D	E
Value	20%	35	15	40	45	80
Risk	20%	75	20	30	85	60
Success	10%	25	15	50	80	55
Compliance	5%	30	65	55	60	30
Relationships	5%	50	50	60	50	35
Stakeholder	15%	80	85	50	70	80
Difficulty	15%	60	60	45	50	25
Urgency	10%	80	65	40	25	60
Weighted Scores	100%	52.3	38.0	43.3	60.0	54.8

Table21: Scoring Model



جامعة الجميع الذكية
EVERYONE'S SMART UNIVERSITY

Third Main Subject: Plan and Control

Agenda-Invitation and Virtual Record of a Virtual Meeting



Meeting Invitation (Weekly)

Details	
Date	Tuesday 10 June 2023
Time	09:00 GMT
Location	Video Call (zoom app)
Link	https://us04web.zoom.us/j/74030813159?pwd=6LjUYq4qTjPOu42vFcv4R1gvNRfEyJ.1
Subject	Weekly Progress for Smart Neighborhood Project

Attendance	
Name	Title
Abdulrahman Saad	Project Manager
Abdulrahman Saad	Engineer
Saud Al-Mohammadi	Contract representative
Our Company employees	Support
third party company	MKC
Government	Government
Stockholders	Stockholders

Agenda
Previous Meeting (points agreed)
Looking at the work done in the smart living project
Strengthening the security level within the neighborhood falls under this work
Buying cameras, setting up control rooms and installing cameras
Points will be discussed in the meeting
The use of renewable energy as falling under this work
Purchase (20) solar energy for smart traffic lights
Installation of (20) solar energy for smart traffic lights
Environmental Enhancement
Find a contractor
Purchase 150,000 trees and taking care of green spaces



Performance Measurement (30-31)

Performance measurement is the process used to assess the efficiency and effectiveness of projects, programs and initiatives. It is a systematic approach to collecting, analyzing and evaluating how “to track” a project/program is to achieve its desired outcomes, goals and objectives.

Performance measurement is typically done by an organization to demonstrate accountability, support decision making and improve processes. Note that It is not an approach that prescribes what must be measured; organizations need to develop their own performance measures based on their project plans and situation.

Performance measurement should be treated as an integral part of any planning process from the outset and should be built into any plan or project that has clear goals and objectives.

Performance measures provide the information to assist in making strategic decisions about what an organization does and how it performs. Performance measurement frameworks are flexible and can be used to measure the effectiveness of a pilot project, a multi-year program or a strategic planning process and can be applied to a new or existing initiative.

Benefits of performance measures

The benefits of measuring performance are numerous and range from measuring the effectiveness of a single project to contributing to a culture of continuous improvement throughout an organization.

Using performance measures on a regular basis helps to inform decisions and means a plan can be adjusted mid-course or priorities can be reset to take advantage of emerging opportunities. An internal performance measurement system will drive results and enable an organization to learn from its successes and failures.



Other benefits of performance measures include:

- Creates “buy-in” through stakeholders setting targets and goals together.
- Develops “best practices” and “lessons learned” that can be applied to future initiatives.
- Increases accountability by demonstrating the effectiveness and value of plans and activities in achieving desired goals/outcomes.
- Informs decision-making including budgeting and resource allocation in an environment where there may be competition over limited resources.
- Helps to demonstrate and document changes over time.
- Helps to communicate an organization’s story.
- Develops relationships through engaging stakeholders and building a common understanding of the process.

Examples of Performance Measurements

Examples of performance measurements are as follows:

- Tracking the ability of the accounting department to collect overdue accounts receivable
- Tracking the speed with which the engineering department can design new products
- Tracking the liquidity of funds administered by the finance department
- Tracking the amount of inventory maintained by the materials management department
- Tracking the amount of scrap produced in the production department
- Tracking the ability of the sales staff to bring in new sales from existing customers

KPI's:

Key Performance Indicators (KPI) are a set of quantifiable measures that a company or industry uses to gauge and compare performance in terms of meeting their strategic and operational goals.



KPIs vary between companies and industries, depending on their priorities or performance criteria. Also referred to as "key success indicators (KSI)".

Why Use KPIs

- Performance effectiveness.
- For the accuracy, actual reflection of the process, efficacy in delivering the outcome.
- The effects of a change can be monitored reliably, repeatedly and accurately by KPI.

How to design KPI's

- KPIs should be clearly linked to the strategy, i.e. the things that matter the most.
- KPIs have to provide the answers to our most important questions.
- KPIs should be primarily designed to empower employees and provide them with the relevant information to learn.

Identifying the KPI's

- Related to strategic aims.
- Identify what makes the organization successful or failures.
- Controllable and accountable.
- Qualitative and quantitative.
- Long term and short term.
- Consider Stakeholder needs.
- Identify important aspects.
- Establish Company Goals and KPIs.
- Select Performance Indicators and Metrics.
- Set Targets and Track Performance.

Types of KPIs

- Process KPIs - measure the efficiency or productivity of a business process. Examples - Days to deliver an order.



- Input KPIs - measure assets and resources invested in or used to generate business results. Examples - Dollars spent on research and development, Funding for employee training, Quality of raw materials.
- Output KPIs - measure the financial and nonfinancial results of business activities. Examples – Revenues.
- Leading KPI measures activities that have a significant effect on future performance.
- Lagging KPI is a type of indicator that reflects the success or failure after an event has been consumed. Such as most financial KPIs, measure the output of past activity.
- Outcome KPI - Reflects overall results or impact of the business activity in terms of generated benefits, as a quantification of performance. Examples are customer retention and brand awareness.
- Qualitative KPI - A descriptive characteristic, an opinion, a property or a trait. Examples are employee satisfaction through surveys which gives a qualitative report.
- Quantitative KPI - A measurable characteristic, resulted by counting, adding, or averaging numbers. Quantitative data is most common in measurement and therefore forms the backbone of most KPIs. Examples are Units per man-hour.

Characteristics of a good KPI

- KPI is always connected with the corporate goals.
- A KPI is decided by the management.
- They are the leading indicators of performance desired by the organization.
- Easy to understand
- Key Success Factors (KSFs) only change if there is a fundamental shift in business objectives.
- Key Performance Indicators (KPIs) change as objectives are met, or management focus shifts.



Defining KPIs

KPIs are usually developed following the well-known S.M.A.R.T. criteria originally developed by George T. Doran (Management Review, 1981) and popularized by Peter Drucker.

- Specific
- Measurable
- Achievable
- Result-oriented or Relevant
- Time-bound



Develop a Change Request Model (32)

Uncontrolled change is one of the project manager's biggest opponents which is why a coherent change management process can be a project manager's best friend. Putting this kind of process in place enables you to deliver what the client has 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 a performance indicator. Typical project manager. Change is inevitable and you must be prepared to deal with it when it happens, not when it happens.

Project change management plan:

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 change 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 must review and endorse the change management plan before it is commissioned.

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. must be mentioned.

Project Change Management Plan 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 modifications can the change management process overcome?

One caveat here: there are often too many small-scale changes that cause damage instead.

When the PCR criteria are defined, for example, the change management plan should specify categories of change requests, such as major or minor:

Major changes: to be documented as PCR major changes in the project:

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

Simple changes: These changes do not require a PCR. Simple changes:

- 1- It does not significantly affect the plan. The completion date of milestones or tasks is not extended using project dependencies.
- 2- It does not have any negative financial impact. No project budget discrepancy will occur as a result.

Approval of 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 established 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 may look at technical problems.

project name	smart neighborhood project	The date of application	1 Jan 2024
change name	Add a training room	change requester	Operating manger
Order number	04	Submitted to	Smart Neighborhood Project Manager
Description of the change:			
Adding a training room for technicians and operators of surveillance cameras			
Reason for change:			
At the request of the Operations Manager with submission of requirements			
priority:			
☒ high ☐ Average ☐ low			
Impact on the estimated budget:			
It is estimated that the cost of the project will be affected by an increase in the total cost of 100,000 riyals, including the design, necessary equipment and furniture.			
the potential risks:			
• Delay in importing computers • Delay in completing the design • Exceeding the specified cost			
Impact on the schedule:			
The schedule is affected by the 5-week period to complete this work.			
Impact of not agreeing to this change:			
High impact on the project in the event of non-approval.			
Reason for rejection, if any:			
There is no.			
Approval date			01/01/2024
approved by			Smart Neighborhood Project Manager

Table22: Change Request Model



Chapter 10: Risk and opportunities – Stakeholder

First Main Subject: Risk and opportunities

The Risks (threats) and opportunities, and give examples

Risk Field	Risk	Threat type (Threat – Opportunity)
Financial Risk	Saving cash flow.	Threat
	Price competition	Threat
	Lower prices or special offers by competitors.	Threat
Operational Risk	Business disruption and system failure.	Threat
	A flaw in the data entry process, an accounting error, or another problem in the business's ability.	Threat
	External fraud: hacker steals valuable information by exploiting lax cybersecurity.	Threat
Market Risk	Demographic growth	Opportunity
	Price elasticity of demand.	Opportunity
	Inflation.	Threat
Compliance Risk	Increasing taxes and fees.	Threat
Technical Risk	Hacked system and program.	Threat
	Keeping abreast of continuous technical development.	Opportunity
Reputational Risk	Increase customer client base.	Opportunity
	Presence in exhibitions and social media to advertising expansion.	Opportunity
Natural Disasters	Damage to physical assets by storm or earthquake	Threat

Table23: Examples of Risks (threats) and opportunities



Risk Register

#	description	category	probability	impact	priority	owner	respond
1.1	Financial Risk	Internal	Likely	Major	6	Project Manager & investment management	Finding quick and emergency financing solutions as a backup plan
1.2	Operational Risk	Internal	Very likely	Major	9	Project Manager	Equipping an emergency team with a procedural guide with comprehensive solutions to all operational problems
1.3	Market Risk	External	Likely	Major	6	Quality management & marketing management	The marketing and quality team anticipates market problems and finds urgent solutions to them
1.4	Compliance Risk	Internal	Likely	Moderate	4	Quality management & Law team	Quality and legal teams develop a plan to deal with complaints and issues
1.5	Technical Risk	Internal	Very likely	Major	9	Project Manager	Contracting with a technical company to solve technical problems immediately
1.6	Natural Disasters	External	unlikely	Major	3	Project Manager	The project manager assigns a team to prepare a plan to deal with natural disasters

Table24: Risk Register



Qualitative Risk Analysis

	impact	Major (3)	High	Extreme	Extreme
		Moderate (2)	Low	High	Extreme
		Minor (1)	Low	Low	High
			Unlikely (1)	Likely (2)	Very likely (3)
	probability				
#	description	probability	impact	Analysis (#)	analysis
1.1	Financial Risk	Likely	Major	6	Extreme
1.2	Operational Risk	Very likely	Major	9	Extreme
1.3	Market Risk	Likely	Major	6	Extreme
1.4	Compliance Risk	Likely	Moderate	4	High
1.5	Technical Risk	Very likely	Major	9	Extreme
1.6	Natural Disasters	unlikely	Major	3	High

Table25: Qualitative Risk Analysis



Risk Response Strategies (33)

- First What are risk strategies:

A risk management strategy is to build a specific process with the aim of updating and regularly reviewing evaluation based on new developments or actions taken in projects. A risk management strategy provides a systematic and coherent approach to identifying, evaluating and managing risks

- Identify risk response strategies: There are four strategies to respond to risks.

1- Risk avoidance: It is the removal of a specific threat or danger by removing the causes of the risk.

2-Risk Acceptance: Accepting the consequences of a risk.

3- Risk Transfer: Transferring matters related to risks and their management responsibilities to a third party

4- Risk mitigation: reduce the impact of risks by reducing their incidence



Second Main Subject: Stakeholder

Stakeholder Engagement Assessment Matrix

Stakeholder	Influence/ Interest	Unaware	Resistant	Natural	Supportive	Leading
Project Manager	High/High					C - D
Engineer	High/ Low				C	D
Contact Representative	High/High					C - D
Support	High/High			C - D		
Community	Low/Low	C		D		
MKC	Low/High			C - D		
Government	High/ Low			C - D		

Table26: Stakeholder Engagement Assessment Matrix



References:

- 1- <https://www.wallstreetmojo.com/board-of-directors/>
- 2- PMBOK 6th Edition
- 3- <https://www.guru99.com/initiation-phase-project-management-life-cycle.html>
- 4- <https://toolbox.hyperisland.com/stakeholder-analysis>
- 5- https://www.mindtools.com/pages/article/newTMC_05.htm
- 6- Communication in the institution by Dr. Samia Awaj
- 7- Scientific and Educational Horizons
- 8- <https://squareup.com/gb/en/townsquare/how-to-motivate-your-employees>
- 9- Organizational Behavior by Stephen Robbins
- 10- <https://www.proofhub.com/articles/project-management-conflicts>
- 11- book human resources strategy by Dr. Nawal Boualak
- 12- <https://www.togetherabroad.nl/instrumentation-engineer-job-description-template.html>
- 13- <https://resources.workable.com/system-administrator-job-description>
- 14- <https://www.pon.harvard.edu/tag/negotiation-scenarios/>
- 15- <https://www.indeed.com/career-advice/career-development/types-of-negotiation>
- 16- <https://easy.bi/blog/project-success-factors/>
- 17- <https://www.ies.ncsu.edu/blog/five-critical-success-factors-for-project-managers/>
- 18- <https://www.indeed.com/career-advice/career-development/requirement-gathering-techniques>
- 19- <https://www.projecttimes.com/articles/requirements-prioritization-strategies/#:~:text=Requirements%20prioritization%20is%20the%20process,time%20or%20budgets%20run%20out>
- 20- <https://www.wibas.com/cmmi/gp-27-identify-and-involve-relevant-stakeholders#:~:text=Relevant%20stakeholders%20are%20identified%20among,in%20process%20activities%20is%20planned>
- 21- <https://www.wrike.com/project-management-guide/faq/what-is-scope-creep-in-project-management/>
- 22- <https://kissflow.com/project/avoid-scope-creep-in-project/>
- 23- <https://sprigghr.com/blog/project-management/11-causes-of-scope-creep-what-to-do-about-them/>
- 24- Product management book by Dr. Rodaina Youssef



- 25- <https://testingchange.com/2020/06/10/demings-theory-for-quality-improvement/>
- 26- <https://katanamrp.com/blog/resource-leveling/>
- 27- <https://asana.com/resources/resource-leveling>
- 28- <https://project-management-knowledge.com/definitions/r/resource-smoothing/>
- 29- Procurement and Stores Management Book by Dr. Sabri Al-Karghaly
- 30- <https://www.ontario.ca/document/performance-measurement-agriculture-agri-food-and-economic-development-organizations/what-performance-measurement>
- 31- <https://www.projectmanagement.com/wikis/345150/Key-Performance-Indicators>
- 32- Book Pricing Policies by Dr. Zakaria Azzam
- 33- <https://onlinepmcourses.com/risk-response-strategies-full-roundup-2/>

الاسبوع الحادي عشر ٦/٨	الاسبوع العاشر ٣٠/٧	الاسبوع التاسع ٢٣/٧	الاسبوع الثامن ١٦/٧	الاسبوع السابع ٩/٧	الاسبوع السادس ٢٥/٦	الاسبوع الخامس ١٨/٦	الاسبوع الرابع ١١/٦	الاسبوع الثالث ٤/٦	الاسبوع الثاني ٢٨/٥	البريد الإلكتروني	اسم عضو الفريق رياضي باللغة العربية
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