



Smart Agile Technology

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Introduction

During the last years, the cities and population has increased significantly while there was a remarkable and rapid technology changes in order to fulfill the need of the modern life.

Smart cities have been introduced to highlight the vital role played by Information and Communications Technology (ICT) of industrialization in the previous two decades.

The idea of a smart city has been introduced to highlight the importance of Information and Communication Technologies (ICT's) in the past 20 years for the quantitative and qualitative analysis of industrialization. In literal terms, in smart cities, the ability of a city to meet citizens' needs is seen as an important characteristic. For instance, the core systems of a city include

Smart solutions are a key purpose of SAT. and the implementation of these solutions and sustainable development in the city. These solutions primarily focus on areas such as city administration, transportation, education, and government services such as education, public safety and public health.

Agile methods and iterations allow simple and rapid development and testing of small sections of the production process, so that changes can be made without waiting for the final product, and this is preferable specially in the software development.

Technology and the most trending business tools will be used to enhance our solutions and we are able to adopt the new changes such as Big Data, AI, Machine learning, IOT, Robots, cameras, sensors and for sure the integration with the government's services and the other private partners.

Our SAT:

In order to achieve the SAT Project, we have chosen to work on Agile from the first scratch, specifically the use of “Kanban” Board.

After we created our group, we have conducted multiple meeting to in order to ensure that every member of the team is understanding the objective of SAT, and the needed tasks of the Project competences.

The status of tasks has been divided into three:

- *Open: The new tasks to do.*
- *Doing: In progress tasks*
- *Done: Completed tasks.*

There was a meeting weekly to plan and discuss the tasks, and a review meeting to check and confirm the completed tasks.

Below is our Jira that has been created especially for SAT project.

<https://smartagiletechnology.atlassian.net/>

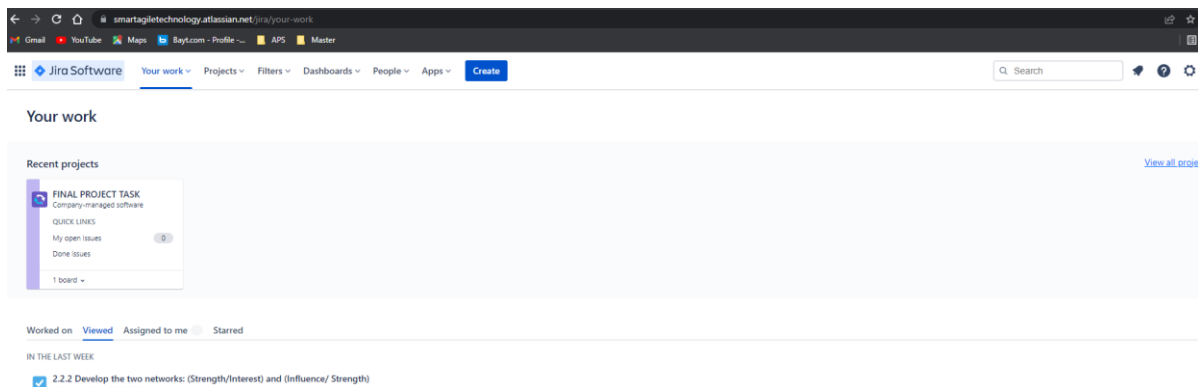


Figure: (1): SAT Jira

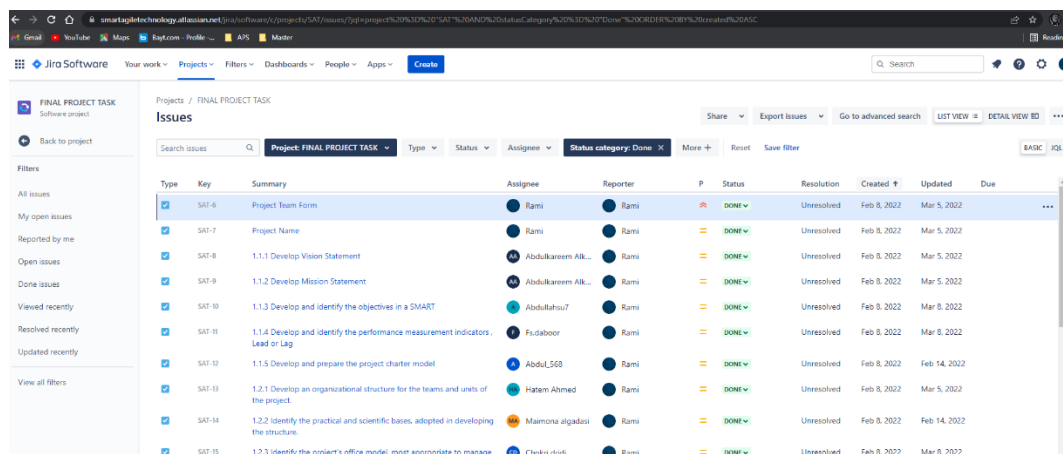


Figure: (2): SAT TASKS

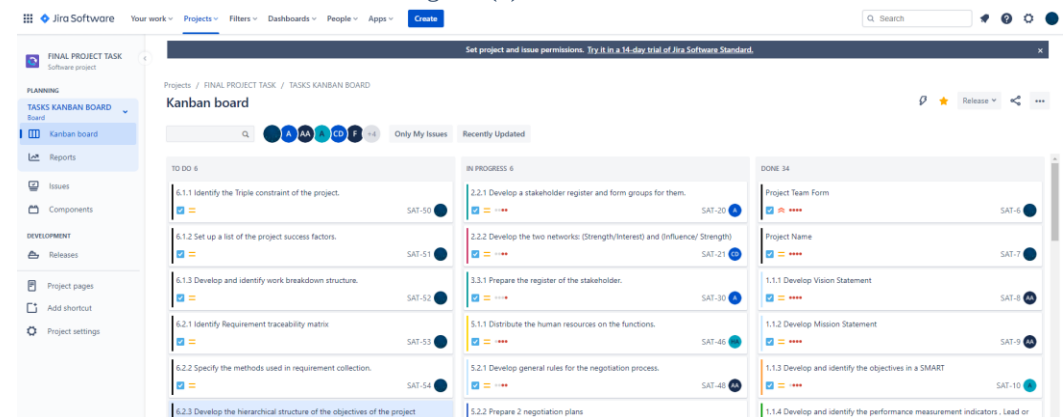


Figure: (3): KANBAN Board

Strategy

1.1.1 Our Vision

Embracing innovation to build a smart life with a strong and high-quality products

1.1.2 Our Mission

SAT is a primer smart solution development company, we ensure that:

- We use the agile methodology in project management to achieve the business value.
- Using modern technology and integrate it with our solutions in order to get the best applications and modern systems
- Working to improve economic growth and transform the individual's living standards to become smarter and easier
- Facilitating transactions and access to services using modern technologies

1.1.3 Develop and identify the objectives in a SMART model



Figure: (4): SMART Objective

Goal setting helps projects to become successful. When a project is initiated, there are certain goals set to make all processes go smooth and easy. SMART goals framework covers specific, measurable, achievable, relevant, and time-bound. This strategy helps to attain specific goals in limited time frame. ‘SAT’ Smart Agile Technology is a company that ensures to develop high quality products and solutions to be applied in the Smart cities using the agile practices.

In addition, the above Objectives:

- Timely development of products and solutions and reach maximum using suitable and impressive marketing strategies.
- Direct discussions and communications made with customers to know their concerns and provide them with better solutions.
- strong, motivated and hard-working team designated to do the job.
- There will be more face-to-face interactions between the project team and clients to be clear about requirements and specifications.
- The teams working on the project would be supportive towards each other to focus on the final outcomes.
- the quality of project will be measured using regular feedback from clients and customers.
- A separate quality assurance team will be dedicated to evaluating the quality.
- There will be timeline set for the project to be completed.
- There will be different sub deadlines to report all processes and do not get a delay in the final product.
- The overall time frame would be set to handle the delays and quality check time would be included too.
- There would be no compromise on the quality.

1.1.4 Develop and identify the performance measurement indicators, Lead or Lag

The smart solution development company SAT will ensure to build a smart life with high quality living standards and a strong economy.

SAT will use lag and lead indicators as the type of measurements in assessing the performance of the company.

Lagging indication is past based that will measure how the company performs. It will measure whether the company is on budget.

The lagging indicators look backwards through the rear window at the road the company has already traveled. These include financial indicators, problem indicators, and performance indicators.

Leading indicators provide a complete set of guidelines to accomplish the project and to achieve the best desired results.

It will enable the company to reserve the trends of using agile and traditional methodologies in integrating the development solutions in order to get the best applications of the project.

Lead indicators will play an important role to measure the risks and evaluate how to mitigate the risks by an effective risk management.

Both lagging and leading indicators result in enhancing the overall performance of SAT facilitating its vision and mission to accomplish. It is a good practice to implement a combination of lag and lead indicators in developing a performance management strategy. However, a lead indicator without a lag indicator will not ensure the best desires results. Both are equally important in selecting the measures to track towards the smart business goals and objectives (Bevins & Wilson, 2011).

Strategic Objective	Lead Measure	Lag Measure
Increase the revenue return and reduce overall cost.	New Products development	Return on investment, less expenses,
Increase business agility	Business Value	Being Agile.
High customer satisfaction	24/7 support.	Commandment to SLA
Develop Teams skills	Cross functional teams	Employee satisfaction

Table (1): Lead & Lag

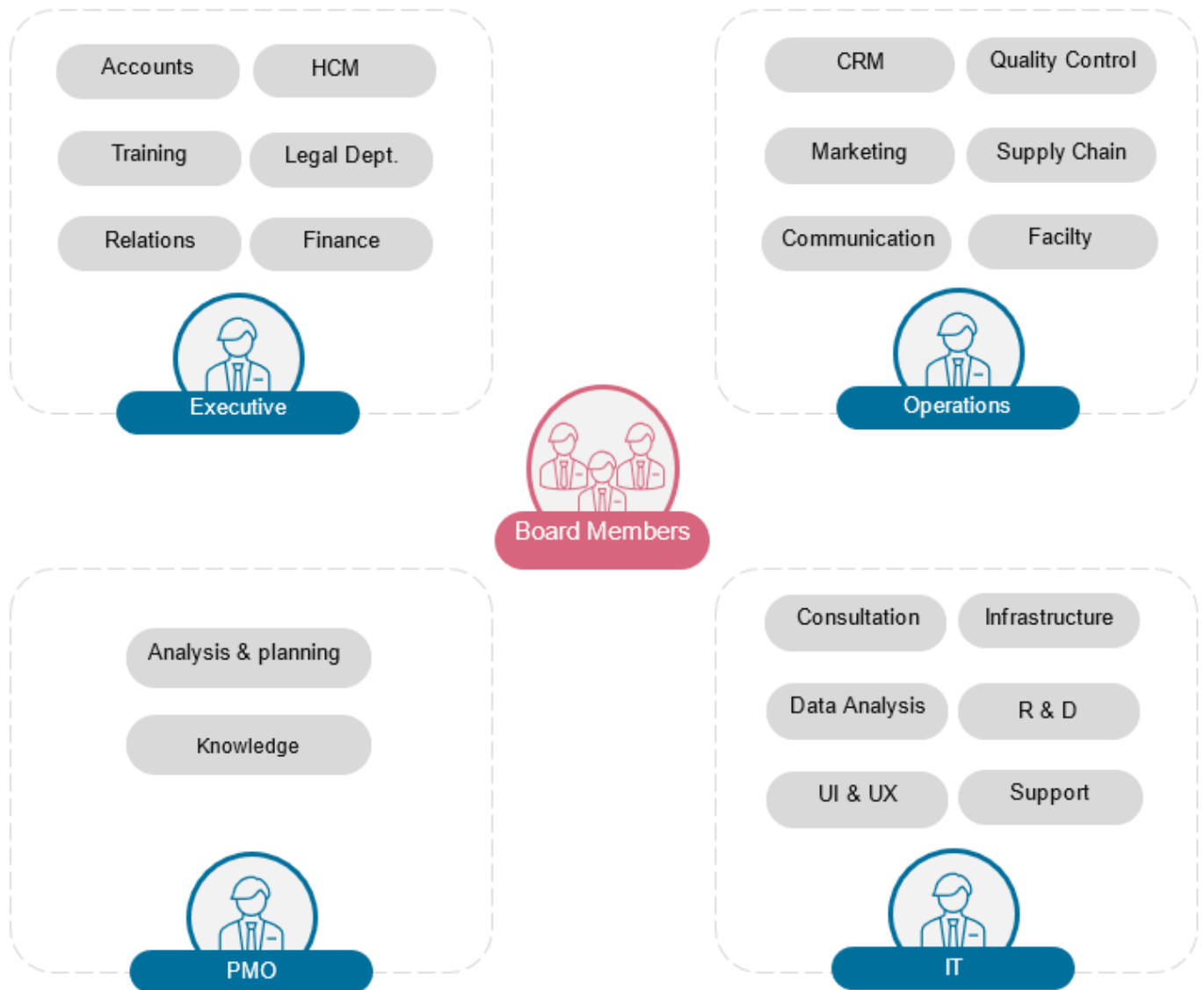
1.1.5 Develop and prepare the project charter model

SUMMARY				
Project Name	Smart Agile Technology			
Project Manager	Rami Al Zahrani			
Project Start – End Dates	Jan 1, 2022 – Jun 30 2022			
Project Purpose	Develop high quality smart solution. Using the trending technology in the product. Implement the agile framework in development. Help in building smart cities by digitalization			
Budget	SAR 5,000,000			
Approved Date				
Approving Body				
SCOPE				
Smart Solutions in Smart Cities.				
BENEFITS				
- Digitize the city administration, transportation, education, and government services - Improve the economic growth - Transform the individual's living standards to become smarter and easier - Facilitating transactions and access to services using modern technologies - New business line with high profits				
MILESTONES & DELIVERABLES				
Deliverables	Main Tasks	Start	End	Lead
Project Plan	Resourcing & planning			Rami
Agile framework				Saleh & Maimona
Governance and legal Plan	Contracts & approval			Hatem & Abdullah
Change Management Plan	align changes to the business goals			Dridi & Fuad
Partnerships & Alliances Plan	Mutual Value			Abdulrahman & Abdelkarim
POTENTIAL ISSUES & RISKS				
Issue / Risk	Description	Probability (H, M, L)		Impact (H, M, L)
Development issue	Failure to meet the deadline	L		M
Financial Risk	Over budget	L		H
Operational risk	Lack of resource	M		M
PROJECT TEAM				
Role	Name	Location		
Project Manager	Rami Al Zahrani	Riyadh		
Member	Saleh Al Malki	Riyadh		
Member	Hatem Ahmed	Riyadh		
Member	Fuad Dabbour	Riyadh		
Member	Maimona	Riyadh		
Member	Abdulrahman Al Zughaibi	Riyadh		
Member	Abdullah Basha	Riyadh		
Member	Dridi Ch.	Riyadh		
Member	Abdulkareem	Riyadh		
AUTHORIZATION				
Approved by Project Sponsor:	CEO	Date:		
Approved by Project Manager:	Rami Alzahrani	Date:		

Figure: (5): Project Charter

Governance, Structure, and process

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



The list of business units mentioned in this structure describes the most important jobs required in the company. One employee can occupy several jobs (several of the mentioned jobs), or work through external contracts with Service providers, partially or completely.

Figure: (6): Organizational structure

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

- Building the structure and the flow of operations is based on achieving customer satisfaction through early and continuous delivery of its requirements.
- Building the structure horizontally to facilitate the transfer of information, its adoption, and its implementation.
- Easily build the structure to create ease of sequencing between functions and enhance human communication and feedback, also to adapt to changes to achieve desired business outcomes.
- Integrating the client and stakeholders into the organizational structure to achieve client satisfaction, reach the client's perception and desire, and adopt his permanent participation in the decision-making process, which leads to increased client retention, keeping the client in the implementation cycle and making changes according to his observations.
- Make the development manager an integral part of every department to speed up software development times, to bring developed software to market faster, and flexibly responding to changes more important than sticking to the business plan.
- Building self-organizing work teams, designs and requirements emanating from these teams and be interested in technical and professional excellence.
- Facilitating the departments' communication with each other through the ease of the organizational structure.

1.2.3 Identify the project's office model, most appropriate to manage the project, in addition to mentioning the reason.

As main purpose of the PMO is to facilitate project success by establishing best practices, mitigating risks and ensuring on-time project delivery within a specified budget. PMO team fulfill a variety of functions on a day-to-day basis including:

- Developing, encouraging the use of the processes and standards.
- Managing resources for projects and reporting on financial information such as return on investment.
- Delivering training and mentoring project team members.
- Gathering data about project progress/producing reports, monitor and evaluate project performance to established goals.
- Prepares risk analysis and action plan to mitigate the risks
- Managing dependencies across multiple projects.

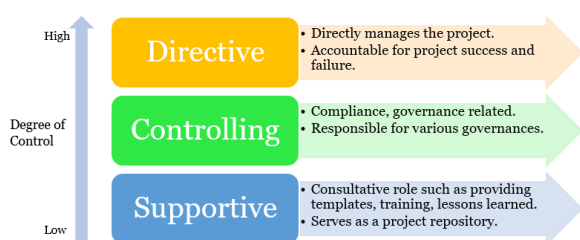


Figure: (7): PMO office Types

Based on the degree of control and influence they have on projects, there are several types of Project Management Offices. However, of the many types, there are 3 distinct types of PMO

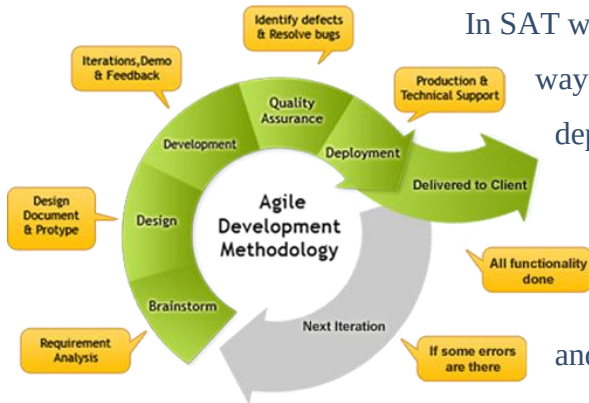


Figure: (8): Agile Development

In SAT we aim to deliver the solutions in agile style. Moreover, it's a way of working not only for the development team but the other departments like HR, Finance, and for sure the PMO, etc.

The agile approach requires minimal planning, maximum collaboration, and provides the ultimate benefits. We need to analyze, while working in parallel, moving one step at a time, and being able to smoothly change directions.

The Project Management Office in SAT works in a flexible manner between (supporting and Directive) with the data of the stages of work and projects in the company due to the company's (agile) methodology that is flexible. I will be appropriate to adopt supportive PMOs and Directive PMOs. It plays the supporting role in the case of projects that are compatible with the strategic objectives of the company. It performs the directive actions in the case of projects that need high direction to be aligned with business strategy

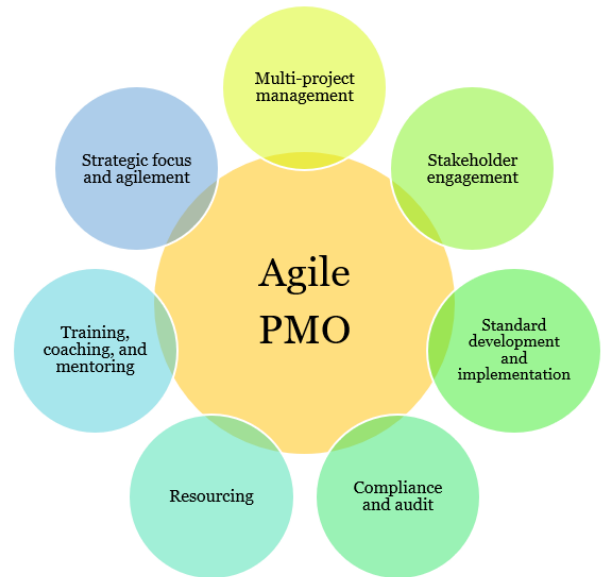


Figure: (9): Agile PMO

This ensures the power and authority to rely on functional managers. However, directive PMOs to be the ultimate leader and controller of the projects

Compliance, standards, and regulations

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

There are many specifications set in the beginning to meet deadlines and criteria in the end. A schedule and SMART goals-based approach make a project get completed more successfully. A project's success involves so many factors to be considered. There are standards and quality-based standards that are required to be met to result in effective and efficient results.

The below models which are used in SAT solutions that explain the traceability to support the outcomes compliance, evolve in tandem with the system under development. Verification determines that the current system increment was built according to the specifications captured in the backlog, and in alignment with the Solution Intent (i.e., we built the solution right).

In addition, the expected outcomes of each goal are mentioned and are compared in the end to know what is left and what is done. The expected outcomes also make everyone aware of the need for and importance of each goal. The time frame helps to record progress and update each goal.

Time Frame	Goal	Activities	Expected Outcomes	Measures of Success
First month	Obtain the needed government approval	Check with a local law advisor	Approved letter for SAT company	Government's authority approval
January-Feb 2022	Develop four Business solution	Survey city to know the problems and issues	Products Plan	The available manufacturing products would be incorporated
Feb 2022	The solutions are proposed with the help of over 3 agile practices	All team members are engaged in getting a suitable output	Team members would collaborate and coordinate to yield better solutions	Team leader would get feedback from members to keep everyone involved
January-June 2022	support clients 24/7 and approach for solutions as per agreement	Clients are never to be felt ignored, team members are always available to address the issues	Clients would feel involved and be updated about the progress	Clients would be asked about their expectations and suggestions to avoid confusions
May-June 2022	The quality of products is super fine and error-free at the time of delivery	Develop plans to check the quality of products	Specific measures are set to analyze the quality at different stages of manufacturing	Debugging by dedicated members of the team
January- June 2022	The development of high-quality products and solutions is delivered within 6 months	Meeting deadlines is a priority along with following the standards and protocols	The timely delivery itself is a sign of positive and good quality product	The schedule is set in the beginning and is updated in the entire 6 months

Table: (2): compliance model

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

Initiating and Planning:

- ✓ Understand business case and benefits management plan
- ✓ Develop project charter
- ✓ Identify stakeholders and determine their expectations, interest, influence, and impact
- ✓ Select project manager
- ✓ Determine company culture and existing systems
- ✓ Create measurable objectives and success criteria
- ✓ Collect requirements
- ✓ Create project management plan
- ✓ Develop schedule
- ✓ Develop budget
- ✓ Perform risk identification, qualitative and quantitative risk analysis, and risk response planning
- ✓ Request changes
- ✓ Determine quality standards, processes, and metrics
- ✓ Plan communications and stakeholder engagement
- ✓ Create Ecosystem for agile methodology

Executing phase

- ✓ Direct and manage work by teamwork
- ✓ Integrating and performing the activities of the project in accordance with the project plan
- ✓ Produce product deliverables
- ✓ Request changes
- ✓ Acquire resources
- ✓ Develop and manage teamwork
- ✓ Manage communication
- ✓ Conduct procurements
- ✓ Implement risk responses
- ✓ Manage stakeholder engagement

Closing phase

- ✓ Close project
- ✓ Gain final acceptance of product
- ✓ Releasing the final deliverables to the customer
- ✓ Complete financial closure
- ✓ Handing over project documentation to the business
- ✓ Conduct lessons-learned studies to examine what went well and what didn't

Power And Interest

Considerations for Agile environments

Projects experiencing a high degree of change require active engagement and participation with project stakeholders. To facilitate timely, productive discussion and decision making, adaptive teams engage with stakeholders directly rather than going through layers of management.

Often the client, user, and developer exchange information in a dynamic co-creative process that leads to more stakeholder involvement and higher satisfaction

Regular interactions with the stakeholder community throughout the project mitigate risk, build trust, and support adjustments earlier in the project cycle, thus reducing costs and increasing the likelihood of success for the project, in order to accelerate the sharing of information within and across the organization, agile methods promote aggressive transparency.

The intent of inviting any stakeholders to project meetings and reviews or posting project artifacts in public spaces is to surface as quickly as possible any misalignment, dependency, or other issue related to the changing project.

2.2.3 Use the logical diagrams for the register of the stakeholder

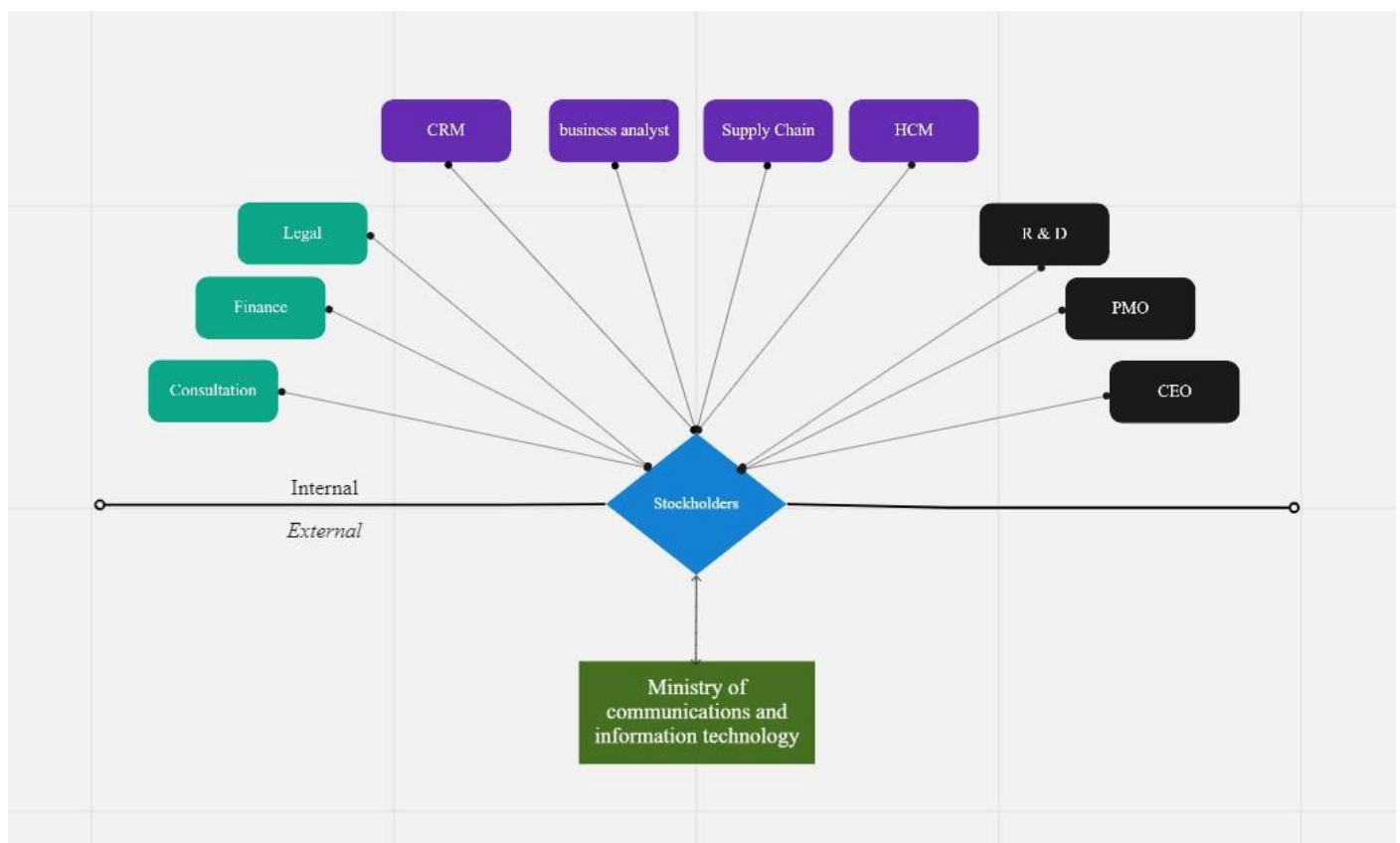


Figure: (11): Stakeholder Logical Diagram

Culture and Values

2.3.1 Identify the culture of the organization

The individual's ability to intelligent development plays a fundamental role, and the value of all knowledge is known to the individual participating. That knowledge is transmitted through a network of communication between employees constantly, which the worker obtains, develops, and gives to others so that productivity increases. The idea of smart development is often associated with the ideas of the "spirit of innovation" and the "knowledge society". This is not a fantasy, but there are actual applications

As “smart employees” they are supposed to be innovative, flexible, with multiple experiences and networking contacts. Smart projects depend on the participation of employees to improve lives through innovative technical means.

That is, the employee shares his views in project management and participates in making decisions that concern all parties so that they have an impact on the development of projects. and smart growth. Employees participate through a network of information and decision-making processes without being responsible for decision-making.

2.3.2 Provide proposals of the organization’s values that can be adopted.

Culture is the result of the lessons learned by the organization over its lifecycle, and it will be driven by the Values that should be aligned with SAT strategy.

In SAT, our Values are raised by the Fundamentals of the agile Values. As Below diagram



Figure: (12): Agile Values

In addition to the mentioned agile Values, In SAT we are adopting other values as: Commitment, Focus, Openness, Respect, Courage and Innovation.

Self-reflection and self-management

3.1.1 Specify “3” personal behaviors of the student that can influence the project

1- Exaggerating co-worker's mistakes in the team

Amplifying the faults of others is one of the most common negative workplace situations that is not an appropriate attitude. It is very normal for an employee to make a mistake in his work.

2- No compliment the good work of others, rather try to pull them down by speaking negatively

In those times, there are few employees who do not appreciate the good work others do or never praise any other employee in the office.

This is one of the worst negative attitudes that completely destroys one's personality because the appreciation and encouragement of your colleagues are very important in the workplace.

Even worse is the negative behavior that people talk badly about an employee who performs well in the workplace

3- No ownership, when committed a mistake

It is very common to make a mistake on the team. There are few people who are afraid of owning the responsibility for making a mistake or somehow escaping from accepting the mistake. This kind of situation is not healthy and causes a negative feeling in the whole team.

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

There are a few negative-minded people who try to destroy the career of others by highlighting the **mistakes** they have made. Yes, it is absolutely necessary to make them understand their mistake and help them recover from them. But don't spread it all over the office, as it will eventually lower their morale and they will feel bad about it.

One of the worst **negative attitudes** that completely destroys one's personality because the appreciation and encouragement of your colleagues are very important in the workplace, it's mandatory to appreciate and recognize the achievements that has been done, a monthly appreciation award will be giving to the best employee for each department.

Ownership is a must, whether in positive or negative circumstances. Because avoiding ownership in the workplace is a very negative attitude. We encourage people to take the needed risk, be brave and work things right.

A quote has been said, “If you want to build a great company, create an environment where someone can raise their hand and say ‘I disagree’ without any fear of victimization or termination”

3.1.3 Conduct a self-professional assessment by using the SWOT model

In SAT, it is important to know all major and minor factors revolving around it. Observations and preparations help a project grow and become a better version of itself. The SWOT analysis refers strength, weakness, opportunity and threat. There are internal and external factors part of a SWOT analysis. Strengths and weaknesses are the internal factors whereas opportunities and threats are the external factors of a project.

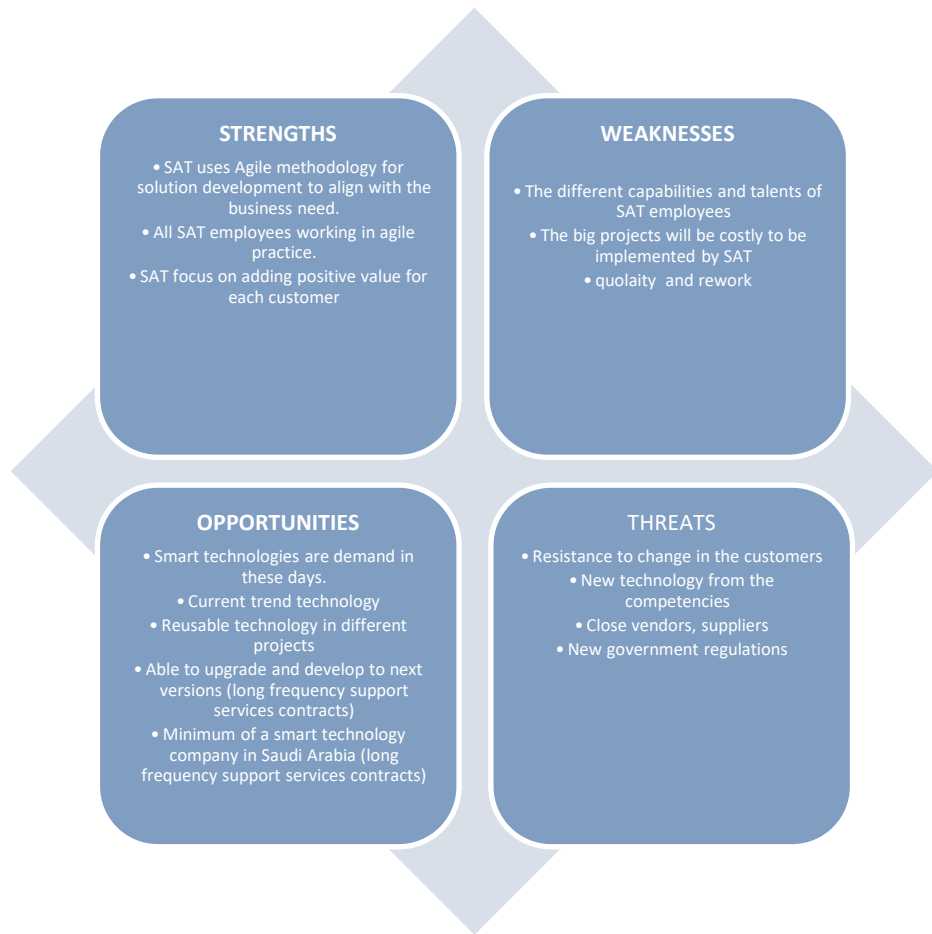


Figure: (13): SWOT model

Personal integrity and reliability

3.2.1 Provide “3” behaviors that contradict moral integrity.

Unacceptable workplace behaviors are typically outlined in a company's employee policy manual along with the company code of conduct. While these formal documents usually cover the more common, critical, and extreme types of behaviors, more etiquette-centered behaviors aren't always covered but are also important to understand.

1. *Bullying*

Bullying has become one of the most pervasive and problematic workplace behaviors. Aggressive employees, often insecure in their own performance or production, target high-performing but vulnerable employees. They bully them by either aggressively picking on them for their performance, manipulating them into doing the bully's tasks, or helping the bully achieve a higher position or better opportunities.

2. *Harassment*

Harassment includes discrimination against someone based on legally protected such as age, race, and gender. This is known as creating a hostile work environment.

3. *Bad Manners*

A wide array of behaviors falls under the category of bad manners or poor etiquette. Leaving messes behind in work areas or break rooms, arriving late to work or meetings, leaving a cell phone on during meetings, misuse of company equipment, being rude to clients or partners, and violating ethical conduct codes are examples.

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

The mentioned unwanted behaviors have a great negative impact on the employees, workgroup, Project and the entire organization.

In addition, there will be a **Financial Impact** either direct cost which as increased disability and workers' compensation claims, increased medical costs etc. or indirect cost as low-quality work, reduced productivity, high staff turnover, increased absenteeism, deteriorated customer relationships, and loss of positive public image

Socially The impact will reach to a level that threatens the health of people. if not addressed. The environment could be changed to be a Toxic, the effect could harm people and causes many work conflicts, negativity, sickness, high turnover, and even bullying. Even worse

As a result of all of this, on **the technical side** a weak product, uncompleted development and not meeting the deadline.

Personal Communication

3.3.1 Prepare the register of the stakeholder.

#	Name	Type	Role	Contact Person
1	Ministry of communications and information technology	External	Regulator	Abdulrahman 05xxxxxxxxx
2	CEO	Internal	Sponsor	Ahmed 05xxxxxxxxx
3	Rami Al Zahrani	Internal	Project Manager	05xxxxxxxxx
4	Saleh Al Malki	Internal	R&D	05xxxxxxxxx
5	Hatem Ahmed	Internal	HCM	05xxxxxxxxx
6	Fuad Dabbour	Internal	Consultation	05xxxxxxxxx
7	Maimona	Internal	CRM	05xxxxxxxxx
8	Abdulrahman Al Zughaibi	Internal	Business Analyst	05xxxxxxxxx
9	Abdullah Basha	Internal	Supply chain	05xxxxxxxxx
10	Dridi Ch.	Internal	Finance	05xxxxxxxxx
11	Abdulkareem	Internal	Legal & approvals	05xxxxxxxxx

Table: (4): stakeholder register

3.3.2 Identify the personal communication and the effective communication

Communication is one of the most important qualities that the project manager should possess in order to carry out the project management in the required manner,

The Effective communication is the lifeblood of all project management teams and underpins all skills that are needed to deliver successful projects.

For communication to be effective it must be clear, transparent, and diverse.

Effective Project Communication

- Make use of technology.
- Keep cultural and language barriers in mind.
- Understand who should get what information and how.
- Set up a communication strategy
- Use a variety of channels and tools
- Be empathetic and understand your team
- Provide regular updates
- Manage conflicts effectively;
- Develop better communication skills;

The Active listeners spend 70% of their time listening and only 30% of their time talking

3.3.3 Identify the shapes, models, and channels of personal communication.

There are many different types of communication to successfully manage the project within SAT organization. Project communication has many different sides that the project team need to be able to handle.

There are many perspectives to project communication. We'll take a look at three types of communication aspects project manager and organization members need to be aware of in SAT work environment:

- *Project perspective*

Communication can be looked at as either internal or external. Internal communication is the communication that takes place between project team members. External communication is communication between project team members and the other project stakeholders.

- *Organizational perspective*

Communication from an organizational perspective can be categorized as vertical, horizontal, or diagonal. This perspective takes into account the way organizations are structured.

In SAT, we depend on the horizontal communication between people at the same organizational level and across the agile teams.

- *Formality perspective*

Whether formal or informal, in SAT we need to make sure to communicate with a purpose based on the situation in order to get the values.

Communication Methods Used in SAT

There are three different ways we communicate with others. No matter what form of communication we choose, it is important to have the right intention to connect with the other person.

1. Written: Emails/Chats and messaging

It refers to printed or recorded materials such as plans, contracts, memos, minutes of the meeting, requirement analysis document, design documents risk registers and other related written materials. It is used to provide well-thought and well-planned details, thus easily to be reviewed than verbal communication because everything that has been written cannot be altered right away.

2. Oral/Verbal: F2F conversations

It involves the exchange of message or information by using words verbally through face to face or phone conversations, it paves way to get feedback right after receiving the message. It is spontaneous but the ability to listen and think carefully before speaking is critical.

3. Visual Communication

Visual aids such as animation, color, illustration, graphs and charts, drawing, signs and logos immensely enhance written communication. Visual communication is also used in the right balance for making information sharing more effective and efficient.

3.3.4 Establish the communication matrix.

#	Name	Timing	Method	Purpose
1	Ministry of communications and information technology	Monthly	Emails	Approvals
2	CEO	Weekly	Call/Text	Updates
3	Rami Al Zahrani	Daily	Standup meeting	Project updates
4	Saleh Al Malki	Daily	Standup meeting	Update / Review
5	Hatem Ahmed	Daily	Standup meeting	Update / Review
6	Fuad Dabbour	Daily	Standup meeting	Update / Review
7	Maimona	Daily	Standup meeting	Update / Review
8	Abdulrahman Al Zughaibi	Daily	Standup meeting	Update / Review
9	Abdullah Basha	Daily	Standup meeting	Update / Review
10	Dridi Ch.	Daily	Standup meeting	Update / Review
11	Abdulkareem	Daily	Standup meeting	Update / Review

Table: (5): Communication Matrix

3.3.5 Provide 3 wrong scenarios of communication.

1- The formation of parties or groups in the workplace causes enmity and hatred among the team, reduces the focus on achieving goals, and lowers productivity in the organization.

Solution:

Introduce about the importance of employee relations in the organization.

2- The lack of a communication mechanism in the company to communicate and deal with customer requests of different categories and sales and customer service staff in the company.

This leads to the possibility of a loss of customer confidence and a decrease in the reputation of the company

Solution:

Build CRM portal to manage the customer's requests, increase customer satisfaction, publish succussed stories with the customers.

3- Failure to respond to the work team or senior management and delay in responding to calls and e-mails during work hours causes a weak relationship between the work team and distrust and negatively reflects on the productivity of the tasks required from the team.

Solution:

Build a KPIs dashboard for the team tasks \ progress to ensure continued productivity and take corrective action for the bad communication

3.3.6 Develop and prepare stakeholder assessment matrix

A medium, lean and agile smart solution development project, for instance, might only have a few stakeholders.

The PM BOK suggests the following classification which also convenient to SAT organization:

- *Unaware*
- *Resistant,*
- *Neutral*
- *Supportive*
- *Leading*

Following the PMI's taxonomy, the current level of engagement is documented with a “C”. The desired level is represented with a “D”.

Determining the Desired Stakeholder Engagement Level

The PMI framework lists the needs, expectations, interests and potential impact of stakeholders as the criteria to determine their desired engagement level.

This assessment forms the basis of a project's stakeholder engagement plan. The plan sets out the extent and way of the productive involvement of stakeholders in the project.

Stakeholder Engagement Assessment Matrix

Looking at the stakeholders of a SAT transformation project. When creating the stakeholder engagement assessment matrix, e.g., in the process ‘plan stakeholder engagement’, the project manager should refer to the stakeholder engagement plan for the desired level of engagement.

Stakeholder	Unaware	Resistant	Neutral	Supportive	Leading
Ministry of communications and information technology				D	
CEO					D
Rami Al Zahrani					D
Saleh Al Malki				D	
Hatem Ahmed				D	
Fuad Dabbour				D	
Maimona				D	
Abdulrahman Al Zughaibi			D		
Abdullah Basha			D		
Dridi Ch.				D	
Abdul Kareem				D	

Table: (6): stakeholder engagement

When monitoring the actual stakeholder engagement, the project manager adds the observed current level (“C”) of engagement for each stakeholder:

Stakeholder	Unaware	Resistant	Neutral	Supportive	Leading
Ministry of communications and information technology				D	
CEO			C		D
Rami Al Zahrani					CD
Saleh Al Malki			C	D	
Hatem Ahmed				CD	
Fuad Dabbour			C	D	
Maimona				CD	
Abdulrahman Al Zughaibi			CD		
Abdullah Basha			CD		
Dridi Ch.			C	D	
Abdul Kareem			C	D	

Table: (7): stakeholder engagement to be

Leadership

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

Leadership is about change. That is its primal function. It directly contradicts management. Leadership is defined as the ability to create a common vision, which the individuals recognize or adopt as their own, and persuade them to realize it. Leadership uses many styles and methods yet it too boils down to three major processes (Bennis 1985).

In most cases, leadership can be separated into three categories, **Top-down:** where the leadership consists of taking the manager's vision and essentially using the team members as the means by which this vision is carried out. **Bottom-up:** where the leadership consists of taking the input from the team members and coordinating or integrating it in some fashion in order to carry out the vision of the project

However, in SAT as the Agile is a fundamental base for our project **The Servant as Leader is the default leadership style.**

Although servant leadership can be effective when leading self-organizing teams, it isn't the only leadership style that SAT are using. There are many other effective leadership styles are diverse and based on organizational specific Units, goals and the human resources but in general all the different styles comprise leadership, influencing, and decision-making leadership.

4.1.2 Specify the reasons for which such a model is preferred.

In SAT, as we our development methodology is focusing on Agile, and cross functional teams, this type of leader encourages ethical reasoning among those that are followers. The servant-leader typically develops long-term relationships with followers and they encourage their personal development so that they can obtain their full potential. The concerns of the servant-leader are the achievements of all stakeholders; not just a select few.

4.1.3 Provide "5" proposals for the motivation methods that are compatible with the nature of the project.

Maslow's hierarchy of human needs classifies the human needs in five levels. According to this theory, higher level needs become motivators only when the lower-level ones are satisfied. The hierarchy, ordered from the lowest to the highest level

Maslow's Hierarchy of Needs and SAT Values

In SAT, we ensure that that all levels are satisfied, the most basic needs first. and we are helping the employees to achieve their desired goal. SAT will ensure that physiological needs such as food and shelter as the most basic needs, followed by security needs such as personal safety and job security. Social needs such as the need to belong to a group and friendship; self-esteem needs which include recognition and competence; and self-actualization needs for growth and development round out the five types of needs. Others motivations as enable the team, appreciation are fundamentals for us.



Figure: (14): Maslow's needs

Teamwork

4.2.1 Design RACI model for 3 Design RACI model of the project.

When roles and responsibilities are not clearly defined for all parties involved, project management can quickly devolve into disappointment.

RACI stands for:

Responsible: This person does the work to get the task done. The responsible party is generally one person with decision-making power.

Accountable: This person is accountable for the task being correct and complete. The accountable party is also typically one person.

Consulted: These people provide vital information toward the project and make two-way communication mandatory for the project's success. The consulted party generally consists of a small group of people who tend to be experts in a relevant subject matter to the project.

Informed: These people should be kept in the loop regarding the project's progress and make one-way communication essential. The informed party tends to consist of multiple people who are communally affected by finishing the tasks associated with the project's completion.

It's important to note that the RACI chart does not replace any project plan or productivity timeline that our company may utilize to keep up with active assignments. The RACI chart only outlines the functional roles or responsibilities of each worker across major tasks within the project.

Proposed RACI scenarios with SAT project

			ROLES													
			Sponsor	CEO	Ministry of communications and	R & D	Board Member	PMO	Project Manager	business analyst	Consultation	Legal	CRM	HCM	Opreation	Finance
Deliverable or Task		Status	Sponsor / Bored						Project Team			Supporting Resources				
	SAT Strategy		A	R				C				C				I
	Funding		R	A			I	C			I	I				
	Project Plan		I	I				A	R	I						I
	Resources			I				C	I					R	A	I
	Product development			I	I	R			A	I	C					

R

Responsible

A

Accountable

C

Consulted

I

Informed

Assigned to complete the task or deliverable.

Has final decision-making authority and accountability for completion. Only 1 per task.

An adviser, stakeholder, or subject matter expert who is consulted before a decision or action.

Must be informed after a decision or action.

Figure: (15): RACI Model

Conflict and Crisis

4.3.1 Identify the conflict and crisis

Conflict:

It is a situation that occurs when individuals are in a certain situation in which they differ in opinion, viewpoints, or judgment on something, and the conflict may start from just plain talk and then develop until it turns into loud screaming, and also the conflict is defined as the competition of a group of people together to make a decision. Certain, it may be related to them personally, or in the work environment, or in something that affects people, or things that the outcome of the conflict affects, and from other definitions of conflict, it is a difference between two parties or more on an idea and each party seeks to confirm He is right, and the conflict continues as long as none of the parties reaches a solution that contributes to stopping the conflict, and this solution may be political, social, or economic, and there are forms of conflict, including crises, differences, and conflicts.

crises:

They are disasters and problems that occur on an international scale, leading to the outbreak of conflict between a group of countries as parties to crises, and often lead to the occurrence of international wars, so all parties seek to try to find solutions to crises, relying on the presence of a neutral party to bring together views, to prevent the escalation of conflict. Examples of these crises are World wars.

problems with administrative communications; Such as misunderstanding, and the lack of successful communication between individuals and administrative institutions to which they belong. Problems related to the organizational structure itself, in two directions; The first: the existence of weak organizational structures, and the second: the absence of organizational structures in the first place, and this confuses the understanding of rights and duties, areas of competence, and administrative responsibility. Problems related to the environment, which are related to the spoken language, the method of communication, the communication approach, the general healthy atmosphere, and the scientific approach adopted in the functional and organizational work environment need these elements, and in the absence of them or the presence of some of them, there is an opportunity for the emergence of conflict. the negotiation process has many roles defined in this table:

4.3.2 Provide 3 expected scenarios of the conflict's events in the project.

Discrimination problems: Discrimination can be a source of intense conflict and may lead to legal problems for the company or its owners. Discriminatory disputes can arise from personal biases on the part of employees or perceptions of employee mistreatment.

As an example of a conflict related to discrimination, imagine a minority employee in a team who feels that most menial work tasks in the group are constantly being assigned to them, that employee may start to resort to resentment against team members and managers, and eventually end up with decreased productivity or outright verbal conflict,

Performance review issues: No employee wants to receive a negative performance review, but negative feedback in the review is unavoidable based on the employee's actions during the review period.

Employees may become angry at not receiving salary increases, promotions, or other performance-related incentives, and may attack this by spreading discontent through gossip and a negative attitude toward work. Employees may argue directly with supervisors during a performance review, creating sensitive situations that require critical communications

Leadership conflicts: Interpersonal clashes between managers and subordinates can cause a range of interpersonal conflicts. Employees may feel degraded or pressured by more authoritarian managers, or they may believe a lack of direction from managers advocates interference. Type A personalities are overly ambitious targets for their subordinates, leaving them vulnerable to failure and inevitable conflict.

4.3.3 Set the optimal strategies to deal with each conflict, and specify the reason for preference

Discrimination related conflict,

Assuming a minority employee in a team who feels that they are constantly assigned the most menial work tasks in the group. With this issue, the manager can sit down with the entire team and discuss the way work tasks are assigned, and make the necessary changes to ensure that the tasks are divided in a fair manner.

Performance review:

To resolve the conflict arising from a negative performance review, work directly with the employee to develop a solid, time-bound action plan to improve his performance and link achievement of these goals with guaranteed incentives, allow employees to express their opinion when setting goals to increase their dedication to achieving those goals.

Leadership conflicts

To deal with a personal mismatch, first, try to gain an understanding between the manager and the subordinates so that they understand each other's view of the situation. Never treat conflict management cases as disciplinary sessions, as if managers were already right and employees inherently wrong; This is a reliable way to lose good employees. If the two cannot reach an understanding, place the employee under the supervision of another manager if possible

4.3.4 Develop root Cause Analysis

Root cause analysis is the process of finding the underlying cause for an effect we observe or experience.

The 5 Whys Technique.

It helps to quickly identify the root cause of a problem.

It helps to differentiate between the contributing factors of a problem and its root cause(s).

It helps determine the relationship between different root causes of a problem.

It can be learned quickly and doesn't require statistical analysis to be used.

5 Whys of failure to meet product delivery deadline

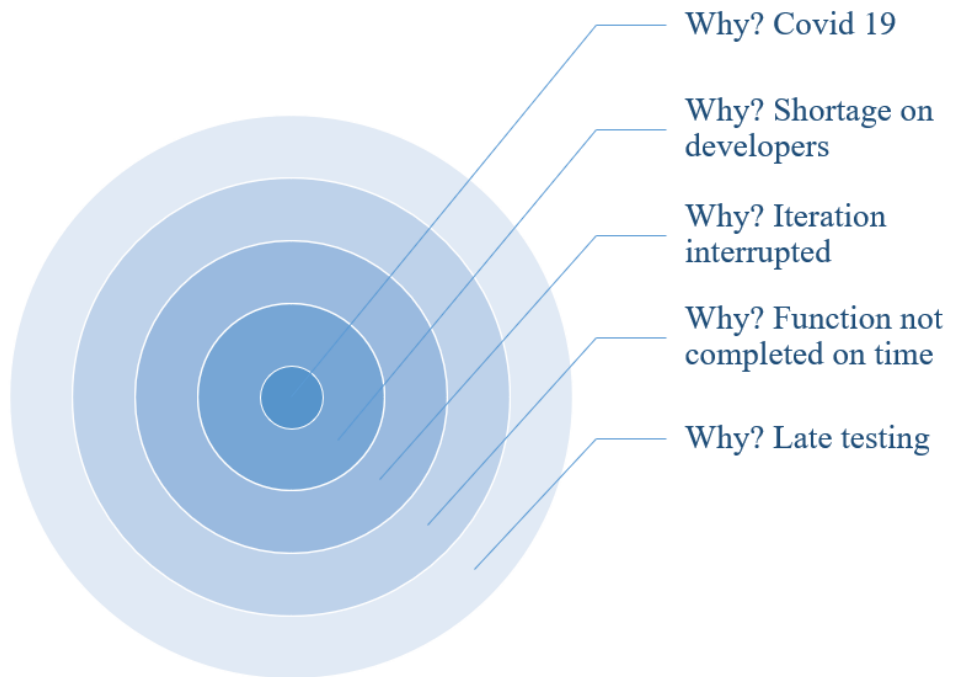


Figure: (16): Root Cause – 5 Whys

5 Whys of over budget

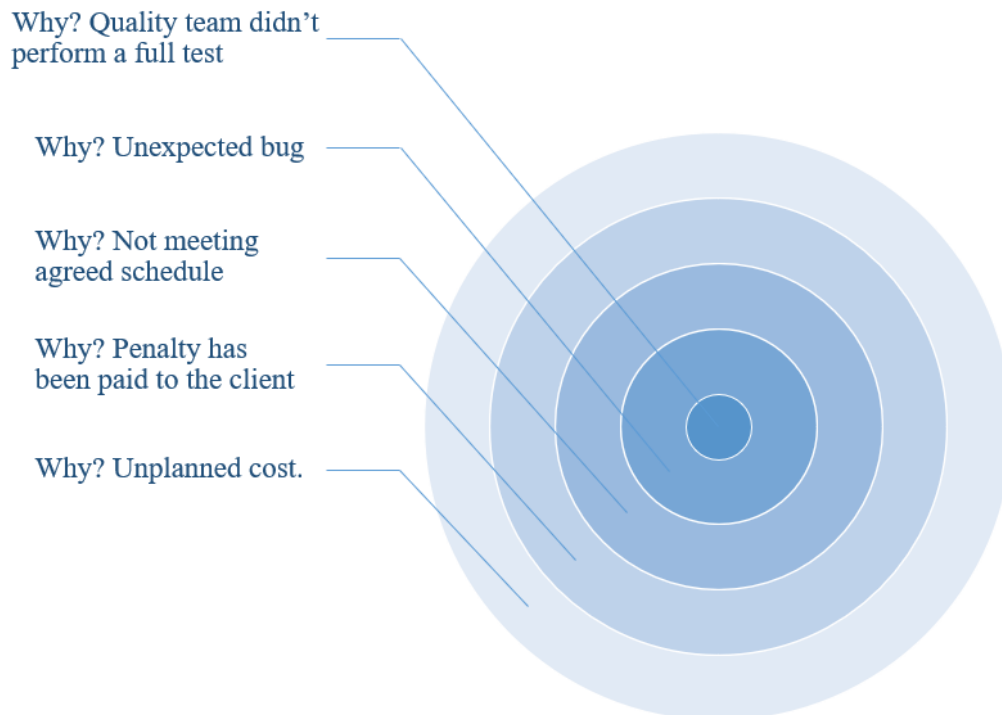


Figure: (17): Root Cause – 5 Whys

Resourcefulness

5.1.1 Distribute the human resources on the functions.

Dept.	Responsible	Tasks	Direct manager
High Management	Chairman of Board of Directors	Preparing strategies, policies, and plans that achieve the interest of the company and working to develop them Assign directors of the company's departments and divisions. Approving the strategies, policies, and general plans of the company. Guide the periodic meetings of the Board of Directors.	Owner
	Member of the Board of Directors	-Participate in setting strategies, policies, and plans that achieve the interest of the company and work to develop them. -Reviewing and evaluating the performance of other departments and setting incentive and benefits policies. -Building strategic relationships and partnerships for the company. -Attending the periodic meetings of the Board of Directors.	Chairman of Board of Directors

Table: (8): High level roles

Dept.	Responsible	Tasks	Direct manager
Mid Management	Operation	Ensure all operations are carried on in an appropriate, cost-effective way Improve operational management systems, processes and best practices Purchase materials, supply chain management. Formulate strategic and operational objectives Perform quality controls and monitor production KPIs Find ways to increase quality of customer service	CEO
	PMO	Managing common resources of the company's projects. Develop a unified project management methodology based on best practices. Develop project management standards, policies, procedures, and templates. Monitor compliance with project management standards, policies, procedures, and templates. Coordination of communication between projects. Attending regular meetings. Submit periodic reports to the Executive Director.	CEO
	Executive	Examine financial data and use them to improve profitability Manage budgets and forecasts Help the organization's processes remain legally compliant Recruit, train and supervise staff	CEO
	IT	Guide the IT team. Developing the field of technology and its tools on the latest technologies and in line with the company's strategy. Ensure the readiness and security of all devices and technical operating systems. Supervising the provision of technical support services to all departments and units of the company. Submit periodic reports to the management.	CEO

Table: (9): Mid-level roles

5.1.2 Analyze the Influence of Conducting Crashing and Fast-Tracking Process

Every project is based on deadlines and a time schedule comprising of different tasks and activities to be done on time. With the advancement in technology, the monitoring process for deadlines is done through several tools and techniques. Fast-tracking is a technique used for this purpose. It helps to speed up operations and deliver the project even before the final deadline decided. Crashing is an assisting factor in gathering additional resources to complete a project at a fast rate. A company that is based on making products that are smartly operated, there is software involved. In a software-based project, there are many things involved.

In this project of Smart Agile Technology (SAT), project managers are responsible of handling the speed and consistency of tasks. They decide on the tasks that can be done in parallel pattern rather than waiting for the turn in a sequential order. For example, the software team can be dedicated to all operations while a hardware team gathers the products and resources that can help to make crashing work. Though the hardware will work along with the software code. But the required things can be assembled together to save time when a code is ready. Moreover, the project can be further broken down into small tasks and activities and all members can be assigned to those tasks at the same time. They can discuss and complete their tasks at a level that can be synced later when all teams are ready to interlink their tasks (Umer Muhammad, 2021).

Further, a survey team can visit the smart city while a software team is preparing the code. It will help to plan and design a code with minimum errors. It would save time and project could be complete sooner than the deadline. It gives time to make changes and improve quality. A fast-tracking technology monitors duties and responsibilities of all members and highlights the progress of anyone lagging behind. This type of supervision is easier to be implemented and practiced. And it is a time saver for delivery of projects and lightening the burden of all member. Daily meetings to discuss progress is also a great help to agile practices

Negotiation

5.2.1 Develop general rules for the negotiation process.

Negotiation is a process consisting of the activities necessary to resolve different types of disputes through consultations between the parties involved to reach a consensus.

Negotiations can take place at any time in the project lifecycle and may be formal or non-formal.

Formal negotiation implies an agreement through contracts and formal documents, while informal negotiations include debates to resolve a conflict between team members, for instance.

In project management, the negotiation process is divided into phases and include:

- *Planning*: the preparation of all relevant information necessary for the discussion.
- *Debate*: here main issues are examined and discussed.
- *Proposal*: the creation of the proposal as a way of solving the problem presented.
- *Revision*: this can include negotiating compromises before an agreement is formalized and before the information is shared throughout the organization.

The negotiation process has many roles defined in this table:

Rule	Project Management Example
Be patient	A better approach is to develop a rapport with the person, ask for permission to provide feedback or suggestions, carefully answer any questions that come up, and take the time to reach a satisfactory agreement.
Be positive	A principle of persuasive influence is to deal with people you like. A positive attitude with project sponsors helps build confidence and credibility in their minds.
Gather information	Ask probing questions about what they are doing and listen to the answers. Find out the schedule or deadline to purchase and then implement the solution.
Know your status	The real opportunity to achieve better outcomes is when one side is anxious to reach an agreement
Limit your authority	Try to negotiate with the decision-maker, so you deal with them directly and get an agreement quickly.
Be prepared	Have a risk management plan that provides advance notice of technology that may not work or tasks that take longer than planned.

Table: (10): Negotiation rules

5.2.2 Prepare 2 negotiation plans

In SAT, we generally agree that there are two main forms of negotiation.

Distributive Negotiation: this is also referred to as positional or hard-bargaining negotiating. It generally pertains to a single issue and often ends up with one person walking away with a bigger piece of the pie (win-lose) or (lose-win)

Integrative Negotiation: this is the softer side of the two forms of negotiation, often referred to as (win-win). This form may also be referred to as interest-based, merit-based, or principled negotiation. Essentially this means that all parties walk away happy and with more or less equal pieces of the pie. Additionally, integrative negotiation generally involves multiple moving parts as opposed to a single issue.

We believe that, Planning the negotiation process with the team and the internal stakeholders will allow better selection, opportunities, and contracting. In SAT, and as our demand is the use of the new technology, we are in need for having a proper negotiation plan.

Although, we prefer to have a win-win solution, in most cases we will be in situation that we can't offer concessions. Therefore, it's a must to have a plan B, C and sometimes more.

Project design

6.1.1 Identify the Triple constraint of the project

Triple constraint is actual the project management triangle which gives an idea about the things that are required for managing the project. The three constraints of this project management tool include cost, scope and time. SAT project is basically an agile project which has the scope to provide smart solutions in smart cities. The total cost of the project that includes all types of cost is estimated to be SAR 5000000. The third part of this model is time, so the total time that is being estimated for this project to be completed is six months starting from January 2022 and ending in June 2022.

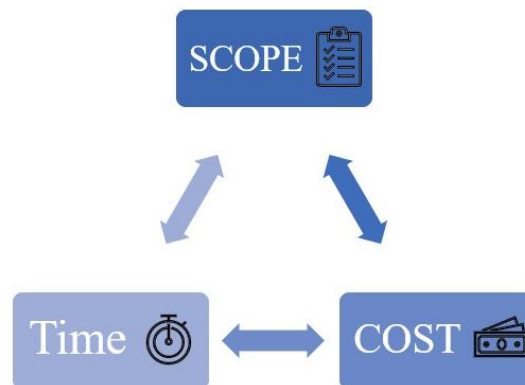


Figure: (18): Triple constraint

The use of agile method for the project helps in simple and rapid development of the small sections of the project. This helps in developing the change and as it is concerned with software development so by the use of available time and cost and considering the scope of the project.

In agile approach there is flexibility on scope while in waterfall the scope is fixed, it cannot be changed.

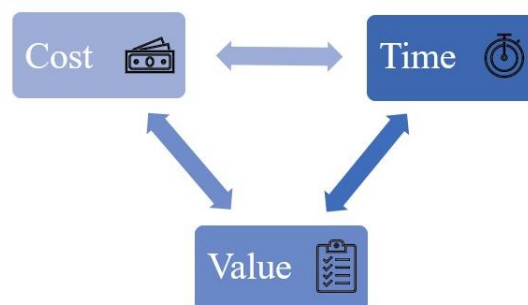


Figure: (19): Agile Triple constraint

Therefore, the triangle is upside down in agile approach as it is flexible and can be changed. So, both the approaches of agile and waterfall has been working on completing the project but their way of working is different.

6.1.2 Set up a list of the project success factors.

In SAT, we're not only focusing on achieving the Project objectives only, but we aim further to achieve other several goals that will help the society and the stakeholder on implementing the smart cities.

Professional and Intelligent SAT Members:

In SAT, we believe that one of the key factors of success is to have the best human recourse who are ready and looking forwarded to put their skills, with the right training and leadership our SAT Members will be not only employees but partners to succussed in our mission.

Open Communication

An open communication channel is very important in a project for it to be a success.

Use a Professional Software

Professional and intuitive software minimizes the risk of errors and miscalculations, provides the best possible overview of all relevant KPIs, and reliably displays significant data on all necessary devices. In SAT we choose JIRA to be the software to track & monitor the tasks and plan for the products releases. It has many features that will help in implementing agile practices and the sprints along with DevOps tasks and different aspect of the project.

Proper Risk Management

Monitoring & Control

Check our progress and regularly evaluate the results. To quickly understand if the project is on track, define key performance indicators (KPI), and use reports. we will recognize early on when things go sideways and can take countermeasures before greater harm is done.

6.1.3 Develop and identify work breakdown structure.

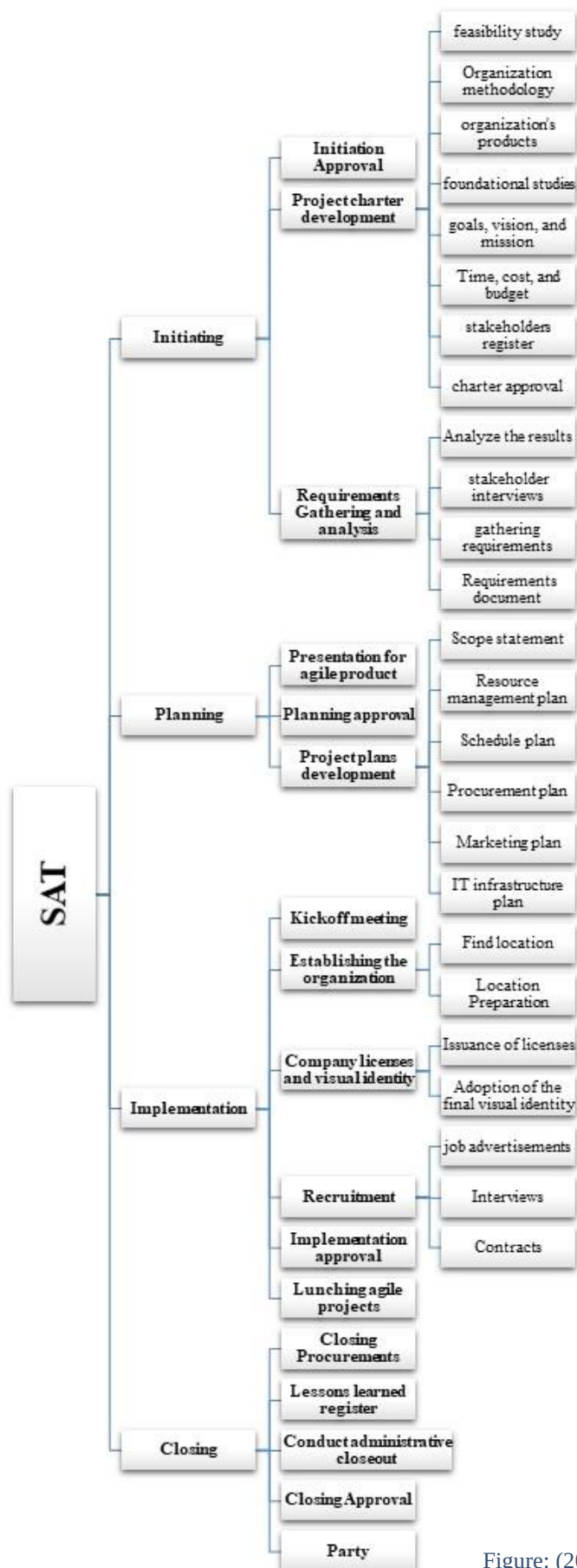


Figure: (20): WBS

Requirements and objectives

6.2.1 Identify Requirement traceability matrix

Requirement Traceability Matrix RTM is a document that maps and traces user requirements with test cases.

SAT is using the matrix to capture all requirements proposed by the client and requirement traceability in a single document, delivered at the conclusion of the Software development life cycle.

It helps SAT development team to validate that all SAT products requirements are checked via test

cases such that no functionality is unchecked during Software testing.

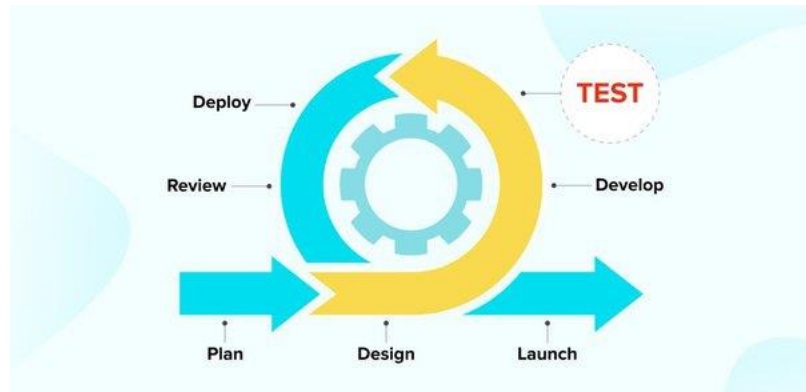


Figure: (21): Development Cycle

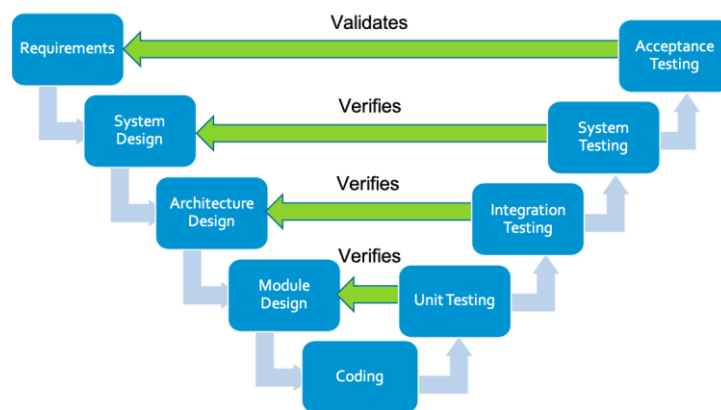


Figure: (22): Testing Cycle

The below template is used in SAT to apply the requirement traceability and ensure that all the requirements are tested and match the business need.

Below example is the Requirement Traceability Matrix template for Smart Parking Project:

REQUIREMENTS TRACEABILITY MATRIX						
Project Name: Smart Parking in (SAT 002)						
Business Requirements Document (BRD)		Functional Specification Document FSD			Test Case Document	
ID#	Use case	ID#	Use Case	Priority	ID#	Status
Infrastructure						
BR_1	Parking zone status	FR_1	Real time zone	High	TC#001 TC#002	pass
		FR_2	Spaces available display	High	TC#003 TC#004	pass
BR_2	Vehicle occupancy detector	FR_3	Install detector in each parking slot	High	TC#005 TC#006	pass
		FR_4	Check the parking slot availability	High	TC#007	pass
		FR_5	Review the detector battery percentage	Medium	TC#08 TC#09	pass

BR_3	Parking area cameras	FR_6	Install IP camera in the parking area		TC#10 TC#11	pass
		FR_7	Detection of vehicles in the parking area for security		TC#12 TC#13	pass
		FR_8	Capture the vehicle plate number and insert it into the DB		TC#14 TC#15	pass
Application						
BR_1	Reservation Module	FR_1	Select parking location	High	TC#001 TC#002	pass
		FR_2	Available parking slot booking	High	TC#003 TC#004	pass
		FR_3	Parking ticket review	High	TC#005 TC#006	pass
BR_2	Payment Module	FR_4	By Credit Card	High	TC#007 TC#008	pass
		FR_5	By Cash in the parking location	High	TC#009	pass
		FR_6	By Reward Points	Medium	TC#010 TC#011	pass
BR_3	Location Guide Module	FR_7	Live map to guide the customer to the parking slot	High	TC#012 TC#013	pass
		FR_8	Parking chick-in	High	TC#014 TC#015	pass
		FR_9	Parking checks out	High	TC#016 TC#017	pass
BR_4	Find your car Module	FR_10	By searching the location of the parking slot detector	High	TC#018	pass
		FR_11	By saving the location in google map (add point)	Medium	TC#019	pass
BR_5	Notification Module	FR_12	Send notification for the invoice	High	TC#020 TC#021	pass
		FR_13	Send Notification for the parking location6	Medium	TC#022 TC#023	pass
		FR_14	Send a reminder for the parking booking	High	TC#024 TC#025	pass

Table: (11): REQUIREMENTS TRACEABILITY MATRIX

6.2.2 Specify the methods used in requirement collection

Within SAT projects we believe that the requirements collection or gathering is not a simple as asking directly our end users and stakeholders how they want a system. Since the vision tend to be limited for some of our stakeholders as well as not aware of full products alternatives with pros and cons and sometime very hard to explain how to lift them up from the status to the next level.

Single requirement collection technique cannot elicit the complete set of requirements and cannot fill the project gap at different phases. We take a multi-faceted approach to requirements gathering, in line with

SAT project general communication mechanism, feeding inputs for our work processes, having the mix of them will improve the coverage of our understanding. Almost **4 main techniques identified:**

- ***Interviews***

It's by asking open ended questions to draw specific answers so interviewee will explain his thoughts and provide reasons for some inputs. Follow up questions, at certain circumstances by email or messaging shall also be in place to really close the gap with many stakeholders specifically who are important and hard to get information from them. It's the top advised agile style to adopt it with almost all SAT project team members and way to gain their confidence and persuade them. Proper Face to face, with direct meeting is applied mainly with our end users along with the influential stakeholders.

- ***Questionnaires or Surveys***

Another effective tool used is collecting offline feedback most since interviews may it challenges the project team, tricky to schedule and time-consuming in addition the requirements we gather scratch the surface of the subject. A well-designed written questionnaire is a good tool for getting at those underlying requirements of which end users may not be fully conscious, but which are essential to a successful data collection with support of illustration, guide them to tell us about their opinions.

- ***Workshops and meeting with brainstorming***

To avoid conflicting information and to resolve them however, before implementation begins. Requirement's meetings and workshops are a good method for resolving such conflicts. Open gathering, give hearing to all participant to provide rationales for their positions.

This helps us to clear the discrepancies and conflicts, gain consensus, and validate the requirements. It's vital for us to ensure the system meeting the needs of all users and stakeholders. Brainstorming is performed as part of workshops and or meeting in groups. Having what-if scenarios and blue-sky ideas break away from existing conventions consider visionary ideas for pushing boundaries by using whiteboards mainly.

- ***Focus Groups***

Focus groups typically involve external stakeholders so a bit different that the brainstorming which more focus on internal ones. Our SAT system engineer and business analysts are skeptical of using focus groups to gather requirements. Focus groups is extremely useful in situation to discuss the solution integration specifically at the evaluation of design prototypes/sketch for validating and finalize requirements.

6.2.3 Develop the hierarchical structure of the objectives of the project

A hierarchy of objectives is a method for analyzing and communicating project goals. It categorizes these goals into several tiers of a hierarchy.

These levels in SAT correlate to an organization's top, middle, and working levels of management.

Purpose, strategy and execution.

Below is the diagram:

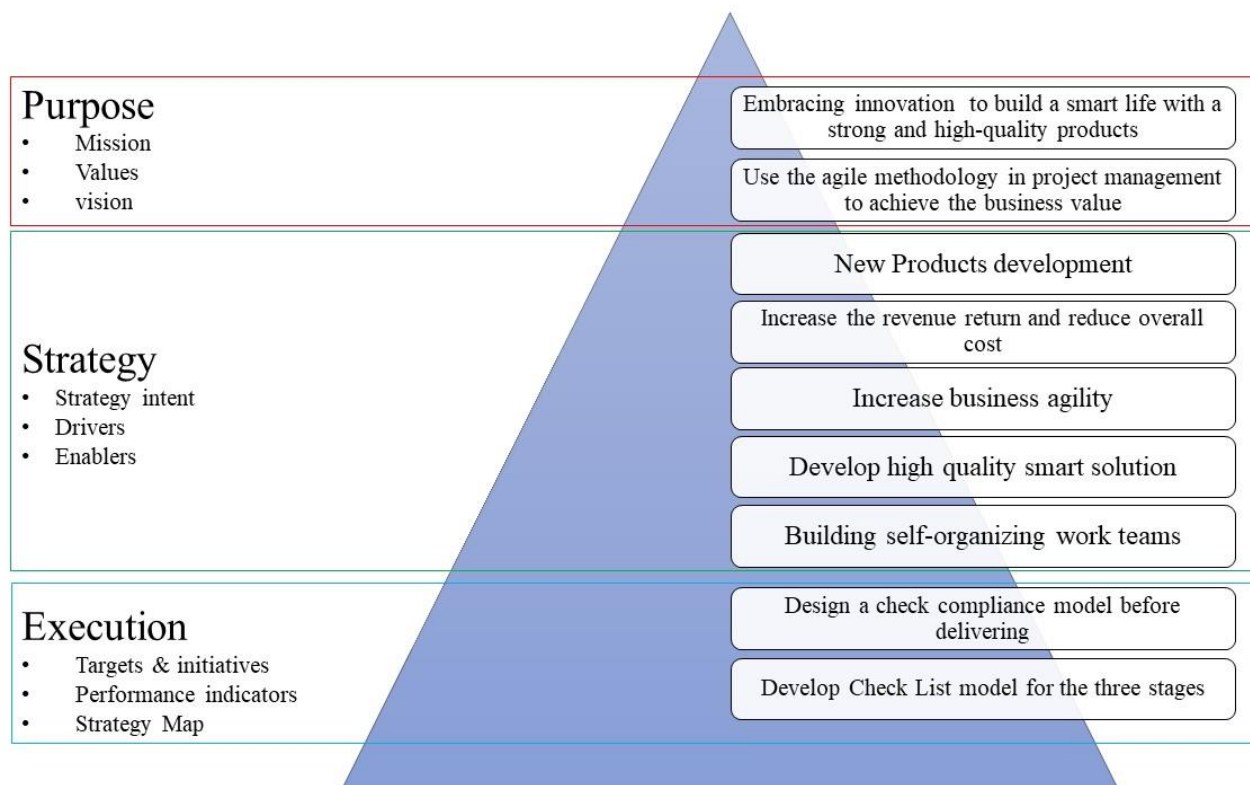


Figure: (23): SAT Objectives Hierarchical

Scope

7.1.1 DEVELOP, IDENTIFY AND PREPARE THE SCOPE STATEMENT

Project name	SAT project
Project sponsor	Rami Al Zahrani
Date of project	January 1, 2022 to June 30th, 2022
Budget	SAR 5,000,000
Scope statement	bring the smart solution in smart cities
Scope description:	The quality of scope of project is dependent on the benefits it may provide to its stakeholders when it's completed. This documentation of all the procedures will gives us the view about the work done on the project and it basically the statement of the work. The management of project scope is important as it will ensure that project scope is accurately defined and mapped. The completion of project is primarily the view in the project is controlled and all processes are carried out. The scope statement for the project of smart agile technology which is managed by Rami Al Zahrani is to bring the smart solution in smart cities.
Acceptance criteria	The major boundaries of project are to develop high quality smart solution by the use of trending technology in the product. It should work on the implementation of agile framework in the development. It will help in building smart cities by the help of digitalization.
Project deliverables:	✓ SAT project plan which includes task of rehousing and planning ✓ Implementing agile framework ✓ Governance and legal plan which include contracts and approvals. ✓ Change management plan which includes the agile changes to the business goals. ✓ Partnership and alliances plan which will create the mutual value for the entire stakeholder involved.
Project benefits:	It will help in digitalization of the city administration, transportation, educational and governmental services, which in turn improve the economic development.

	There is transformation of the individuals' standards of living and facilitate the transaction and access to the services using the modern technologies. There is use of new business line which can be created by introduction of such projects and it will provide high benefits in term of increase return on revenue.
Anticipated risks	The major anticipated risks in this project plan include the development issue as deadline is not meet. The next is the financial risk which means that the project will not be completed in the allocated budget and the last is the operational risk which may arise because of lack of resources.

Table: (12): Scope Statement

7.1.2 Develop, identify and explain Scope creeping

Scope creep occurs when the scope, deliverables, or features on a project expand from what was originally set. When the Cost & Scope raised there will be an effect that causes supplication, efforts and resources out of control.

As SAT main goal is to develop smart application using the agile practices. However, just because changes are welcomed, it doesn't mean that all of them have a free pass into the backlog.

Uncontrolled flexibility can ultimately lead to scope creep and derail the project/product off the roadmap. Despite having a variable scope, you still need to be consistent with your roadmap.

There has to be a clear change management process so that team members don't feel burdened, and project value doesn't drop. In the same times stakeholders' needs must be identified from the beginning along with the agreed deliverables.

Since the scope is derived from the backlog, then one of the most effective ways to manage scope creep is through backlog grooming.

7.1.3 Illustrate product analysis management.

Product analysis is the way to test the product features, costs, availability, quality, appearance, and other aspects.

SAT studied the market and competencies to define the product management approach to be implemented in all SAT products.

There are some of the techniques are used during the study phase, such as:

Product breakdown, Systems analysis, Systems engineering, Value engineering, Value analysis
Functional analysis.

As SAT uses an agile environment to develop the company’s products, a product analysis helps the operation team, and business development team to set a product scope, strategy and create product roadmaps in an agile method by dividing the product into shippable increments with defined acceptance criteria for each release, as shown in the below figure 1.

This method emphasizes evolutionary development, early delivery and getting customer feedback & validation, and continuous improvement to increase customer satisfaction.

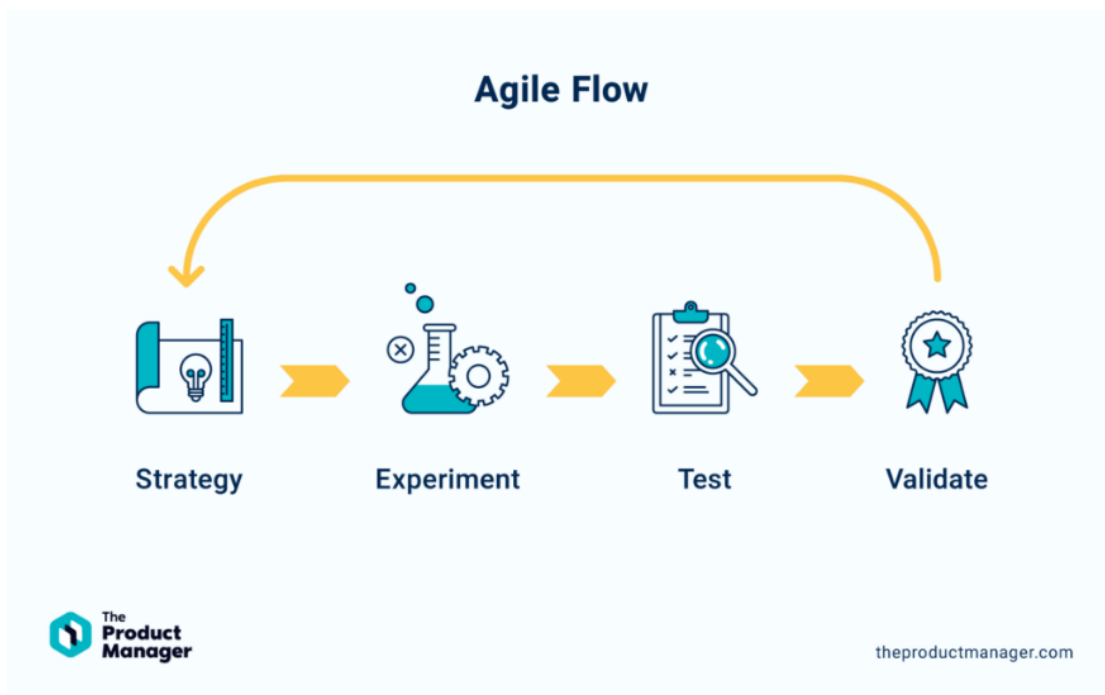


Figure: (24): SAT product management flow

Time

7.2.1 Develop the functions list or the activities included in each work package in WBS

Serial	Level	WBS	Activity Name
1	1	1	Initiating
2	2	1.1	Requirements Gathering and analysis
3	3	1.1.1	Define the process for gathering requirements
4	3	1.1.2	Document stakeholder interviews
5	3	1.1.3	Analyze the results and determine the list of services, modern technologies, and the
6	3	1.1.4	Create a Requirements document
7	2	1.2	Project charter development
8	3	2.1.1	Preparing a feasibility study
9	3	2.1.2	Define Organization methodology (agile)
10	3	2.1.3	Determine the main areas of the organization's products to achieve smart life
11	3	2.1.4	Adoption of foundational studies
12	3	2.1.5	Preparing strategic goals, vision, and mission
13	3	2.1.6	Organization description, business governance, and incorporation requirements
14	3	2.1.7	High level of time, cost, and budget
15	3	2.1.8	Key stakeholders register
16	3	2.1.9	Project charter approval
17	2	1.3	Initiation Approval
18	1	2	Planning
19	2	2.1	Project plans development
20	3	2.1.1	Scope statement
21	3	2.1.2	Resource management plan
22	3	2.1.3	Schedule plan
23	3	2.1.4	Procurement plan
24	3	2.1.5	Marketing plan
25	3	2.1.6	IT infrastructure plan
26	2	2.2	Presentation for agile product
27	2	2.3	Planning approval
28	1	3	Implementation
29	2	3.1	Kickoff meeting
30	2	3.2	Establishing the organization
31	3	3.2.1	Find location
32	3	3.2.2	Location Preparation
33	2	3.3	Company licenses and visual identity
34	3	3.3.1	Issuance of licenses
35	3	3.3.2	Adoption of the final visual identity
36	2	3.4	Recruitment
37	3	3.3.1	job advertisements
38	3	3.3.2	Interviews
39	3	3.3.3	Contracts
40	2	3.5	Implementation approval
41	2	3.6	Lunching agile projects
42	1	4	Closing
43	2	4.1	Closing Procurements
44	2	4.2	Lessons learned register
45	2	4.3	Conduct administrative closeout
46	2	4.4	Closing Approval
47	2	4.5	Party

Table: (13): WBS

7.2.2 Illustrate the relationships between the activities

In project management, there are four types of dependencies that determine the links between tasks:

Finish-to-Start – is a Logical Relationship in which a Successor Activity cannot start until a Predecessor Activity has finished

Finish-to-Finish – The second task can't be completed until the first task has been done.

Start-to-Start – The following task can't begin until the first task has started.

Start-to-Finish – The first task has to start before the second task can be completed.

most of the tasks in our project will be Finish- Start. Below is an example of the activities from the Gantt Chart.

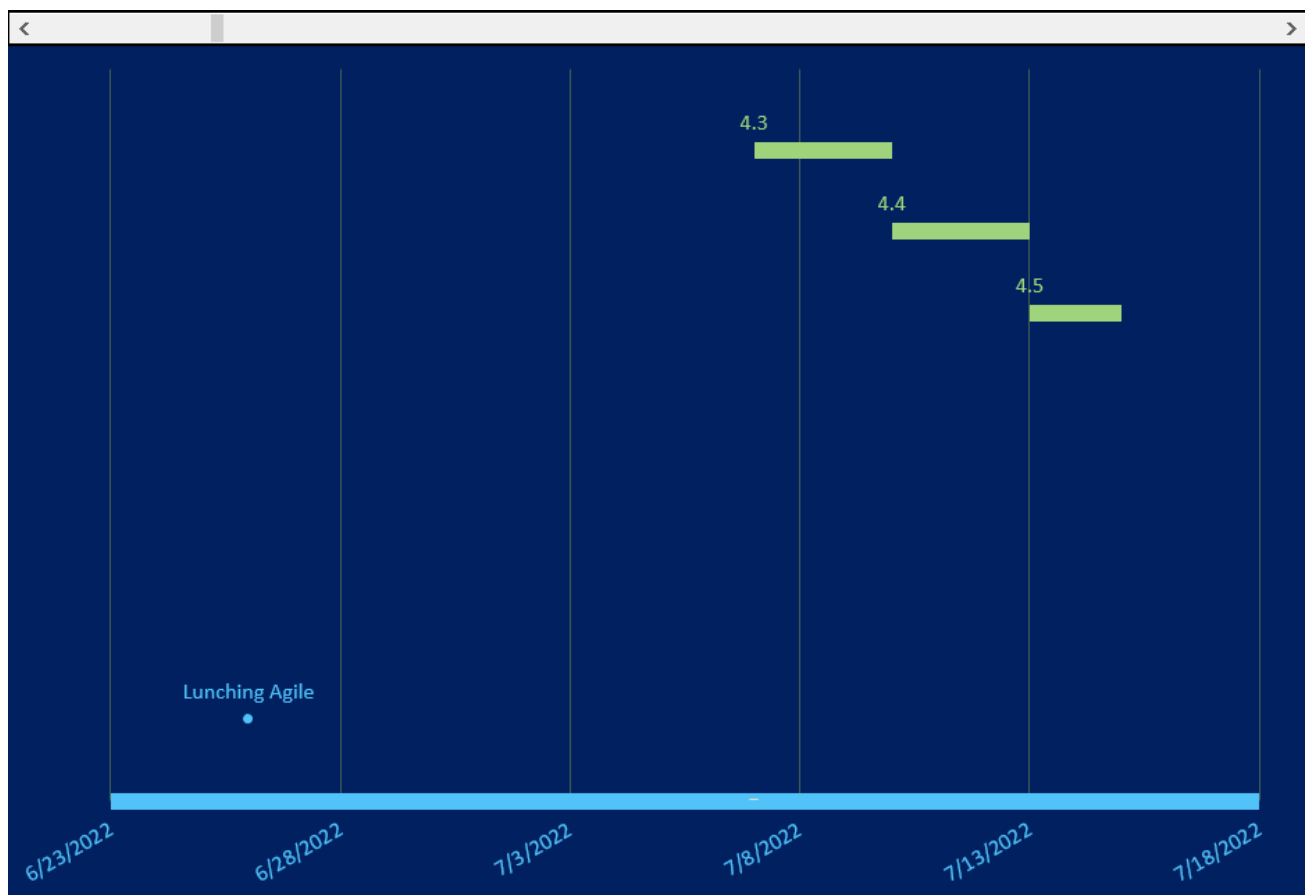


Figure: (25): Gantt Chart Activity Example

7.2.3 Develop the logical diagram of the project activities, and identify the critical path

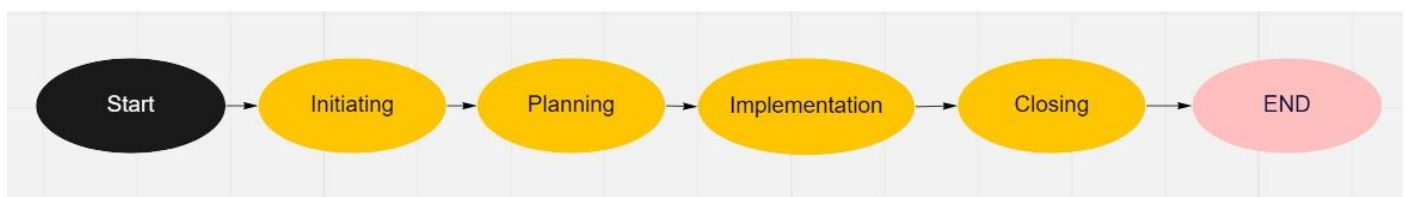


Figure: (26): Major Activity Network Diagram

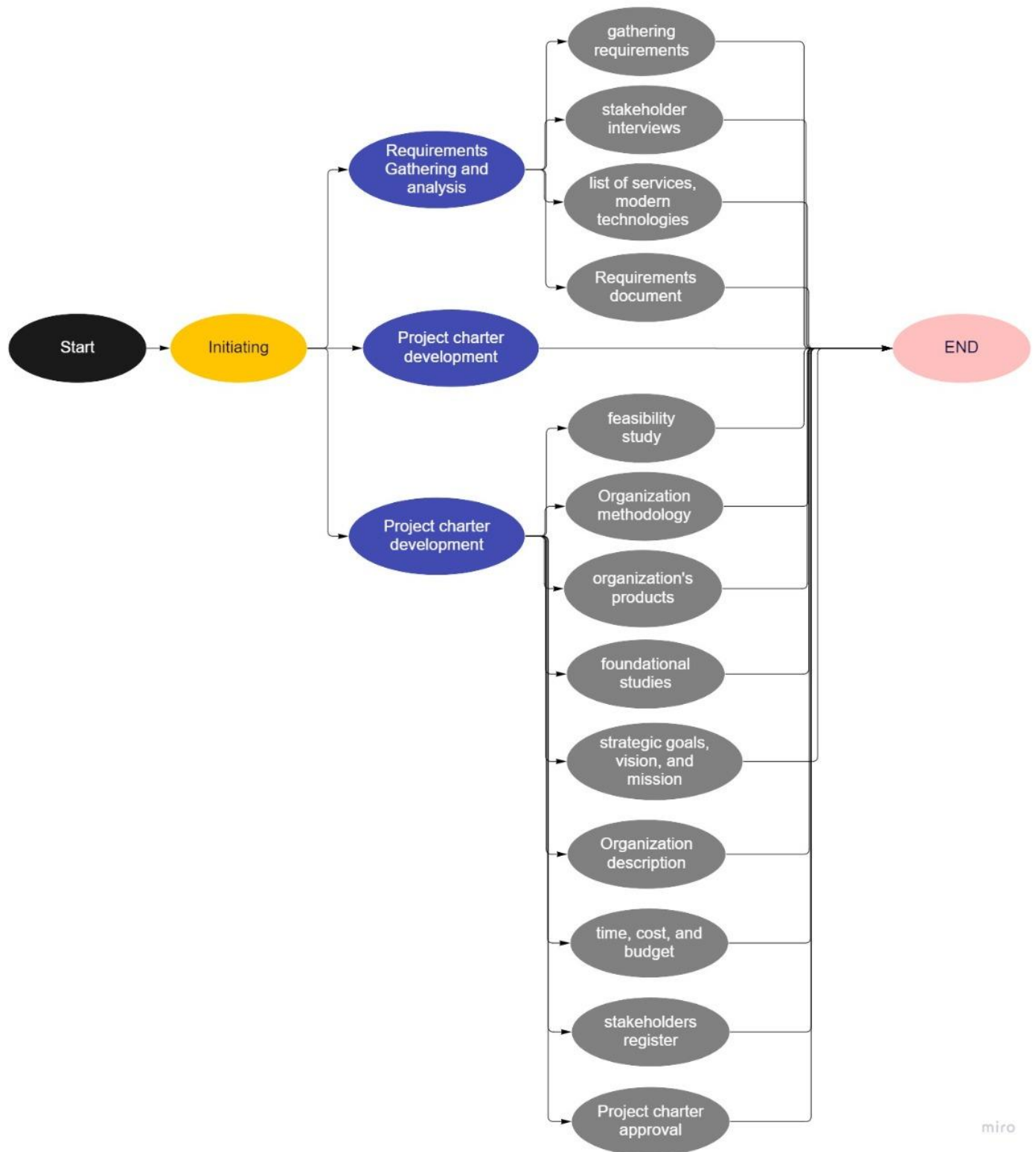


Figure: (27): Activity Network Diagram (Details)

7.2.4 Prepare Gantt chart and Milestones model.

Serial	Lev	WBS	Duration (Days)	Activity Name
1	1	1	82	Initiating
2	2	1.1	25	Requirements Gathering and analysis
3	3	1.1.1	5	Define the process for gathering requirements
4	3	1.1.2	5	Document stakeholder interviews
5	3	1.1.3	10	Analyze the results and determine the list of services, modern
6	3	1.1.4	5	Create a Requirements document
7	2	1.2	54	Project charter development
8	3	2.1.1	10	Preparing a feasibility study
9	3	2.1.2	10	Define Organization methodology (agile)
10	3	2.1.3	5	Determine the main areas of the organization's products to achieve
11	3	2.1.4	10	Adoption of foundational studies
12	3	2.1.5	5	Preparing strategic goals, vision, and mission
13	3	2.1.6	5	Organization description, business governance, and incorporation
14	3	2.1.7	5	High level of time, cost, and budget
15	3	2.1.8	2	Key stakeholders register
16	3	2.1.9	2	Project charter approval
17	2	1.3	3	Initiation Approval
18	1	2	38	Planning
19	2	2.1	33	Project plans development
20	3	2.1.1	5	Scope Statement
21	3	2.1.2	5	Resource management plan
22	3	2.1.3	5	Cost & Schedule plan
23	3	2.1.4	5	Procurement plan
24	3	2.1.5	3	Marketing Plan
25	3	2.1.6	10	IT infrastructure plan
26	2	2.2	3	Presentation for agile product
27	2	2.3	2	Plan approval
28	1	3	55	Implementation
29	2	3.1	1	Kickoff meeting
30	2	3.2	15	Establishing the organization
31	3	3.2.1	5	Find location
32	3	3.2.2	10	Location Preparation
33	2	3.3	15	Company licenses and visual identity
34	3	3.3.1	10	Issuance of licenses
35	3	3.3.2	5	Adoption of the final visual identity
36	2	3.4	15	Recruitment
37	3	3.3.1	5	job advertisements
38	3	3.3.2	5	Interviews
39	3	3.3.3	5	Contracts
40	2	3.5	2	Implementation approval
41	2	3.6	7	Lunching agile projects
42	1	4	13	Closing
43	2	4.1	5	Closing Procurements
44	2	4.2	3	Lessons learned register
45	2	4.3	2	Conduct administrative closeout
46	2	4.4	2	Closing Approval
47	2	4.5	1	Party

Table: (14): WBS & Duration

SAT Gantt Chart

 Track today's date?

Milestones

No.	Position	Milestone
1	1	Charter Development
2	1	Plan Approval
3	1	Lunching Agile

Activity

No. #	Start Date	End Date	WBS CODE
1	1/2/2022	1/27/2022	1.1
2	1/28/2022	3/23/2022	1.2
3	3/24/2022	3/27/2022	1.3
4	3/28/2022	4/30/2022	2.1
5	4/27/2022	4/30/2022	2.2
6	5/1/2022	5/3/2022	2.3
7	5/4/2022	5/5/2022	3.1
8	5/6/2022	5/21/2022	3.2
9	5/22/2022	6/6/2022	3.3
10	6/7/2022	6/22/2022	3.4
11	6/23/2022	6/25/2022	3.5
12	6/19/2022	6/26/2022	3.6
13	6/27/2022	7/2/2022	4.1
14	7/3/2022	7/6/2022	4.2
15	7/7/2022	7/9/2022	4.3
16	7/10/2022	7/12/2022	4.4
17	7/13/2022	7/14/2022	4.5

Figure: (28): Gantt Chart Items

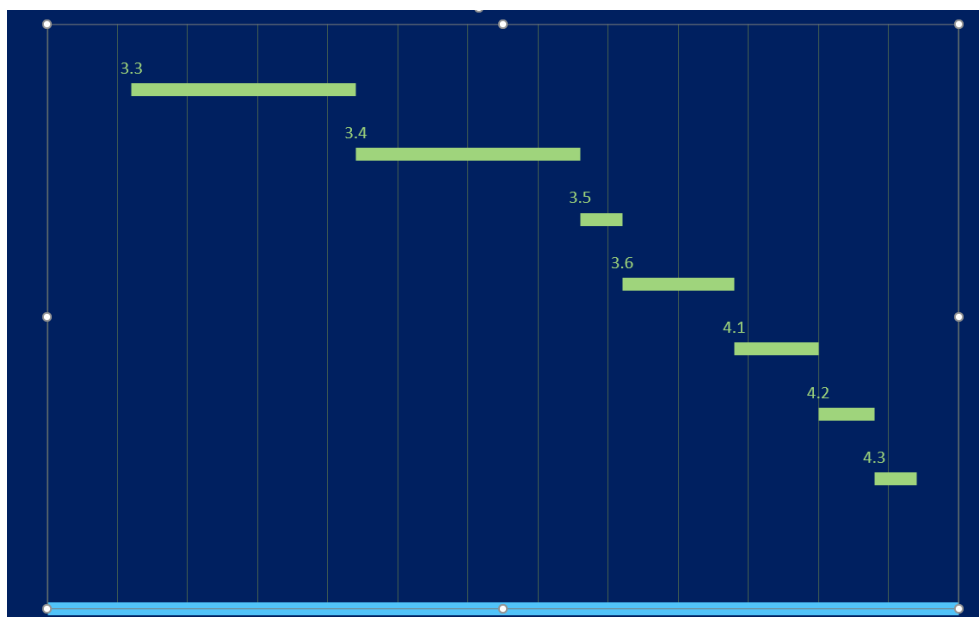


Figure: (29): Gantt Chart Screenshot

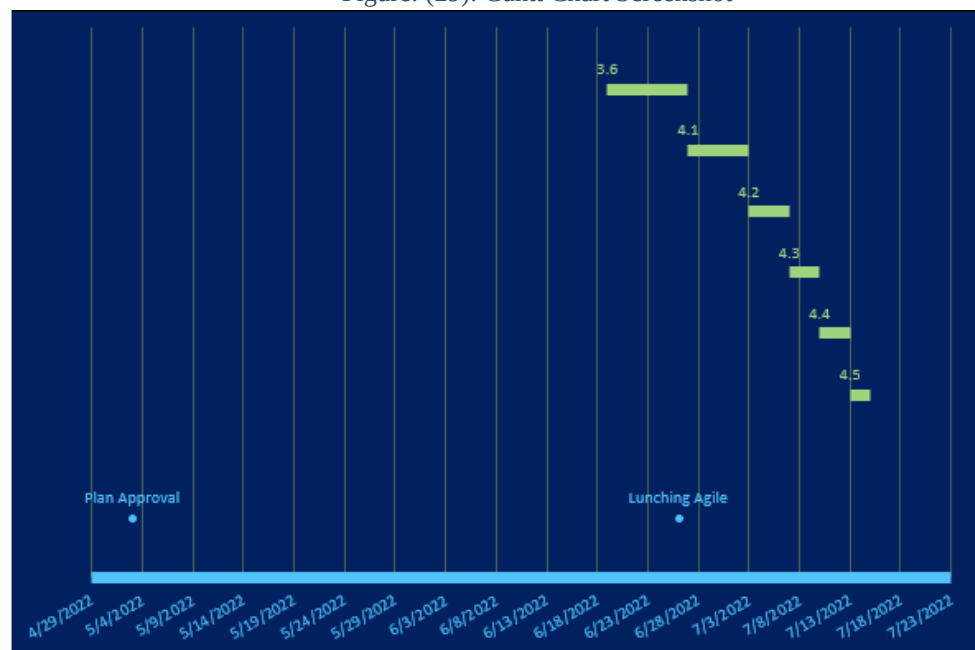


Figure: (30): Gantt Chart Screenshot

Quality

7.3.1 Clarify Deming model for quality.

For any change occurring in the project processes whether during solution design and development and testing, SAT projects team used the PDCA cycle based on the scientific method of proposing a change and implementing it till measuring the results, and taking appropriate action. PDCA cycle is the four stage model providing a framework for developing, testing and implementing changes leading to quality improvement satisfying SAT vision as well as evolving with the technology industry which driving our life's in a fast pace.

It starts by determine the objectives, as PLAN, for a certain processes and required changes to achieve them ahead of time as well as predicting the new process outcome. In SAT which is an agile work environment, iteration planning/definition of acceptance tests are important. Once its agreed and PM approve considering no scope creep or any deviation from the proposed solution, the team proceed with the DO part, for implementation in a day to day iteration execution. Executing the plan by taking small steps in controlled circumstances to avoid deviation and make the product. Collect data for charting and analysis in the following check and act steps.

While implementing, the PM and the supervisory team, always keep an eye on the progress by doing the CHECK steps by evaluating and comparing the results in term of performance, adaptation to the new environment, risks and so on by going with small scale testing, implementing iterative changes to the experiments with proper documentation at every single step.

Reaching the maturity level of the proposed change and accepted result, the team pass to the ACT step, by freezing the solution, standardizing it and stabilizing the change for a certain criterion if not a new cycle will be triggered as part of the retrospectives and subsequent planning. The developing team track the performance and data over time and continuously providing the documentation for internal improvement.

Some benefits about Deming Model

Processing speed: the progression can be evaluated more closely, and assistance can be given if the tasks fail to complete on schedule.

Agility: The ideas can run through testing after a shorter interval after a smaller percentage is completed rather than waiting for the entire process to end.

Performance: It gives a proper detail about what, who, when, where, and how everything is working out. The chances of successful completion are higher.

Areas of application of PDCA cycle

- When we started a new quality and continuous improvement project
- When we implementing the change
- When we are improving or developing a new design for a process or service
- When we are Planning for data collection to verify and prioritize problems or root causes

- At a stage, which complexity may arise, we step back to know what we want to achieve, how we will measure improvement and be explicit about the idea to be tested

7.3.2 Develop the SIPOC model and Ishikawa for one of the issues of the project outputs.

Within SAT organization and during of the newly awarded project for smart parking application, the development team considered the height of the parking sensor at 2.6 m, with the sensitivity of detecting the entrant vehicle at interval height of 1.465 m ~ 1.975 m.

The Retail state owner, the client, accepted the solution for phase 1 and it's going to be applied for phase 2 parking expansion. During the construction, a gov. entity taking care of wellbeing and quality life, audited the project and emphasize that the parking design did not consider parking place for the disabled persons. The client reacted positively to instruct the construction manager to adopt the comments prior official launch.

SAT team, as the ICT scope developer, issued a design change for some lots to consider the sensitivity height to be larger since several car disablers are compact and small and cannot be easily detected in the system, below is the SIPOC diagram illustrating the issue.

SIPOC Diagram

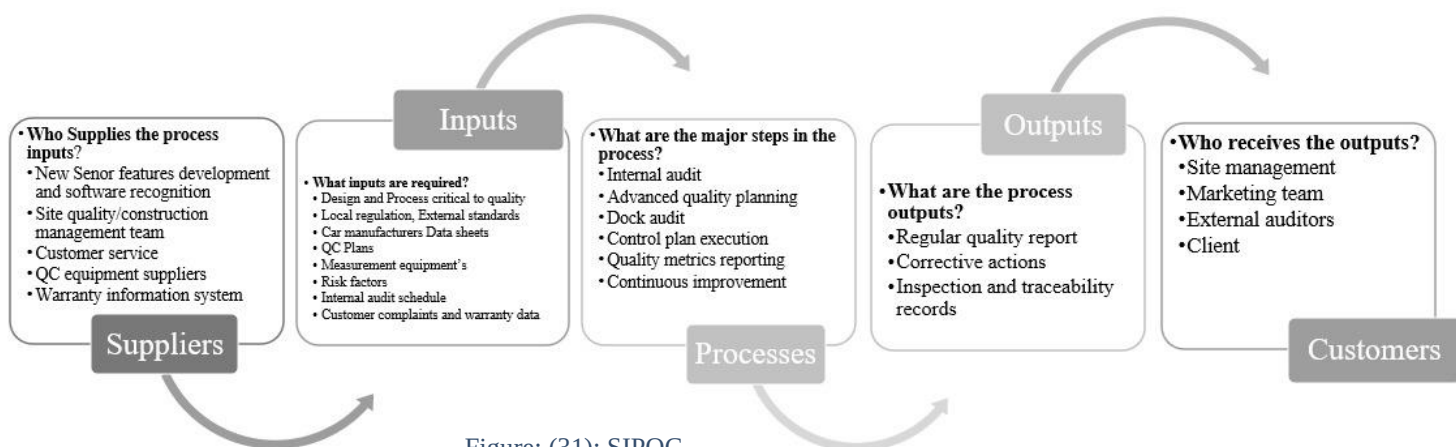


Figure: (31): SIPOC

Ishikawa diagram Once the issue is identified SAT development team create the diagram, we used the following six categories:

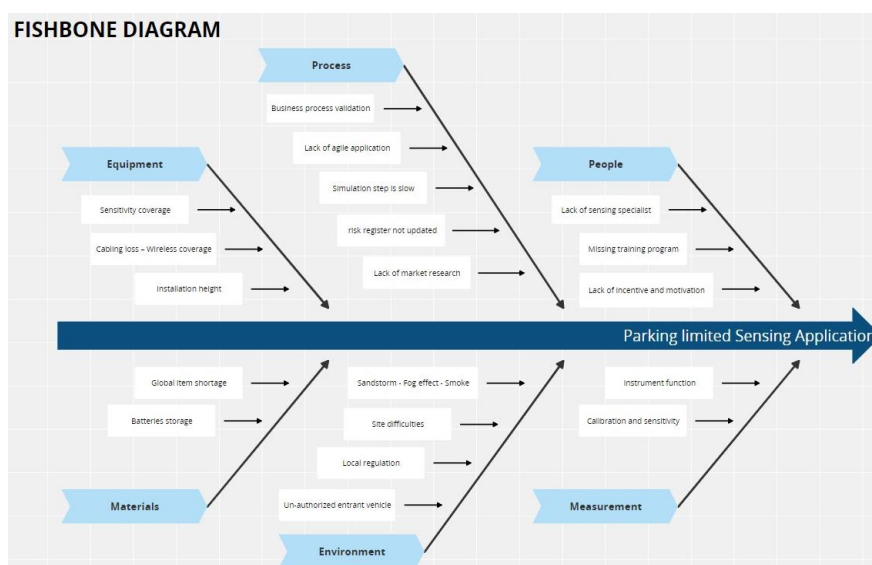


Figure: (32): Ishikawa

Finance

8.1.1 Establish Cost Breakdown Structure, and the project balance by WBS.

Project cost estimating is the process of predicting the total cost of the tasks, time, and resources required to deliver a project's scope of work. In SAT we used multiple methods to estimate the project cost.

- *Expert Judgement Method*
- *Three-Point Estimating Method.*
(from a traditional PERT analysis) $E = (O+4M+P)/6$
- *Previous historical data.*

A	B	C	D	E	F	G	H
Serial	Level	WBS Code	Duration	Unit/ Hours	Rate	Cost	Activity Name
1	1	1	82			207000	Initiating
2	2	1.1	25			65000	Requirements Gathering and analysis
3	3	1.1.1	5	3	1000	15000	Define the process for gathering requirements
4	3	1.1.2	5	2	1000	10000	Document stakeholder interviews
5	3	1.1.3	10	3	1000	30000	Analyze the results and determine the list of services, modern technologies, and the value provided
6	3	1.1.4	5	2	1000	10000	Create a Requirements document
7	2	1.2	54			136000	Project charter development
8	3	2.1.1	10	3	800	24000	Preparing a feasibility study
9	3	2.1.2	10	3	1000	30000	Define Organization methodology (agile)
10	3	2.1.3	5	2	1000	10000	Determine the main areas of the organization's products to achieve smart life
11	3	2.1.4	10	2	700	14000	Adoption of foundational studies
12	3	2.1.5	5	3	1000	15000	Preparing strategic goals, vision, and mission
13	3	2.1.6	5	2	2000	20000	Organization description, business governance, and incorporation requirements
14	3	2.1.7	5	3	1000	15000	High level of time, cost, and budget
15	3	2.1.8	2	2	1000	4000	Key stakeholders register
16	3	2.1.9	2	2	1000	4000	Project charter approval
17	2	1.3	3	2	1000	6000	Initiation Approval
18	1	2	38			113000	Planning
19	2	2.1	33			99000	Project plans development
20	3	2.1.1	5	3	1000	15000	Scope Statement
21	3	2.1.2	5	3	1000	15000	Resource management plan
22	3	2.1.3	5	3	1000	15000	Cost & Schedule plan
23	3	2.1.4	5	3	1000	15000	Procurement plan
24	3	2.1.5	3	3	1000	9000	Marketing Plan
25	3	2.1.6	10	3	1000	30000	IT infrastructure plan
26	2	2.2	3	4	1000	12000	Presentation for agile product
27	2	2.3	2	1	1000	2000	Plan approval
28	1	3	55			1789000	Implementation
29	2	3.1	1	5	1000	5000	Kickoff meeting
30	2	3.2	15			1500000	Establishing the organization
31	3	3.2.1	5	2	50000	500000	Find location
32	3	3.2.2	10	1	100000	1000000	Location Preparation
33	2	3.3	15			40000	Company licenses and visual identity
34	3	3.3.1	10	3	1000	30000	Issuance of licenses
35	3	3.3.2	5	2	1000	10000	Adoption of the final visual identity
36	2	3.4	15			160000	Recruitment
37	3	3.4.1	5	2	5000	50000	Job advertisements
38	3	3.4.2	5	2	1000	10000	Interviews
39	3	3.4.3	5	2	10000	100000	Contracts
40	2	3.5	2	2	10000	40000	Implementation approval
41	2	3.6	7	2	1000	14000	Launching agile projects
42	1	4	13			44000	Closing
43	2	4.1	5	4	500	10000	Closing Procurements
44	2	4.2	3	4	500	6000	Lessons learned register
45	2	4.3	2	4	500	4000	Conduct administrative closeout
46	2	4.4	2	4	500	4000	Closing Approval
47	2	4.5	1	1	20000	20000	Party
48							
49							
50							
51							
52							
Total Estimated Cost						SAR 2,123,000.00	

Table: (15): COST for WBS

Resources

9.1.1 Explain the concept of Resource Leveling and Smoothing.

Resource leveling is a technique overlooks resource allocation and resolve the possible conflicts arising. In SAT, we will be using this in cases of resources not allocated properly and ideally without changing the end date

The noncritical activities will be delayed using the positive slack to reduce the peak demand.

Below is an example of this:

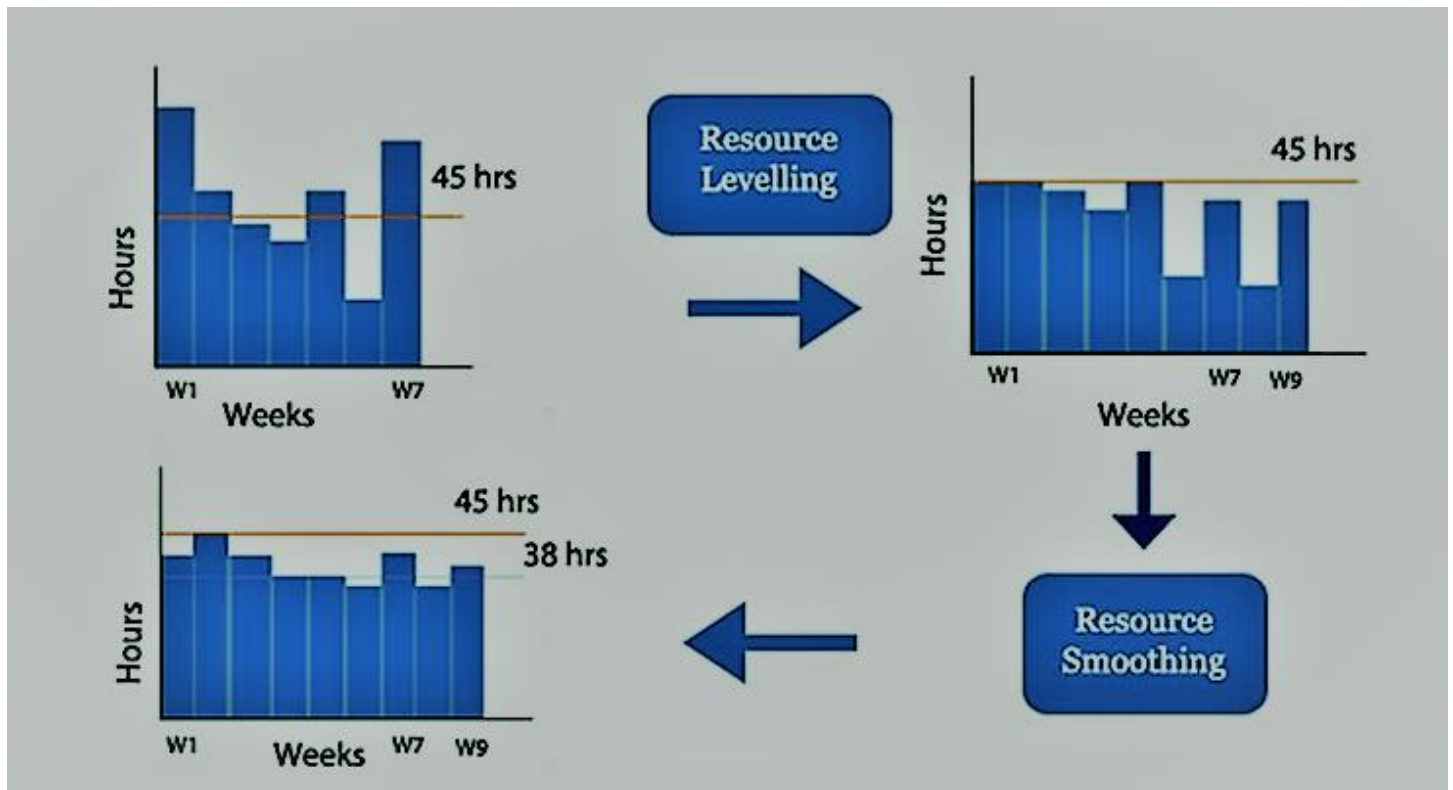


Figure: (33): Resource leveling & smoothing

Procurement

9.2.1 Develop the procurement execution process, and contractor selection.

Smart solutions focus mainly on administrative roles in the community and their smart applications. For the smart solutions part of the company, various things are needed to be procured by the procurement department of SAT company. Since it deals with smart solutions in the field of the city administration, various administrative tools will be needed to procure from a professional and renowned bidder. For example, state-of-the-art city buses and transportation systems.

In this case, the bidder will be asked to give the details of the items that they are going to sell to our procurement department. Multiple other bidders will also be considered so that the best one out of them will be considered and the best buses will be bought. The bidder is also required to provide the procurement department with all the details of the buses, their make and model, and also their key features that support the idea of smart city solutions. Similarly in the education and health sector, various smart tools can be procured from various bidders that give our company the best products at a minimal rate.

Procurement of smartphones and smart tablets and Televisions can be done in this regard for better education of children in schools and colleges. Similarly, hospitals can have an automatic data registration system for which servers and computers will be procured. It is important to state here that the responsibilities of both parties will be taken into account during the procurement process. The terms and conditions must be set forward before the procurement is done. In this way, the seller will be bound to provide all the products that are in excellent quality and condition that were agreed initially in the procurement deal between the bidder and the procurement department.

Agile methods are considered and opted for the smart solutions of this company. This company will be providing software development options to various other companies and small businesses. For this purpose, various software houses will be contacted, and here again, the best bidder will get the contract and hence will provide our company with quality software ready to be used by our clients and companies alike. Like smart solutions, the agile methods in this company are also required to operate in a way in which their procurement would be done in an already made official deal so that both parties are aware of their terms and conditions.

The technology area of our company deals especially with artificial intelligence and works in close coordination and liaison with multiple government agencies as bidders. We deal especially in robotics, CCTV security cameras, and artificial intelligence appliances and gadgetry. For this purpose, the procurement procedure would be simple, that we require artificial intelligence developers as bidders. In an aspect of technological advancement and solutions, we would be giving the contract to the highest bidder who will provide us with good quality security cameras and other gadgets. For security purposes, smart locks could be installed in homes. Procurement of such locks would again be a challenge and hence bidding would take place.

Plan and Control

9.3.1 Prepare agenda- Invitation and virtual record of a virtual meeting.

Meeting Agenda	
Start Date: Feb 22, 2024	Start Time: 1:00 pm
Location: Zoom virtual meeting	Online
Last Meeting: Jan 22, 2024	Next Meeting: Jan 25, 2024

Agenda Item	Schedule	Time	Action
Welcome and Introductions	1:00 pm	5	
Company profile	1:05 pm	5	Informational
customer home reviews	1:10 pm	5	Informational
Clarify the need from the customer	1:15 pm	5	
Break internal meeting	1:20 pm	30	Informational
Show suggested solutions	1:50 pm	10	Decision
Statement of achievement requirements	2:00 pm	10	Decision
financial discussion	2:10 pm	45	Discussion
Review of upcoming meeting schedule	2:55 pm	5	Informational
Adjourn	3:00 pm		

The virtual meeting link:

<https://us06web.zoom.us/rec/share/rwITQFz8WQ8X1AWO4Y8gMINYRNjHeCorG>

* The invitations have been sent to the member's email \ mobile

Name	Contact Information	Email
Rami Alzahrani	0561096696	Rami_alzahrani@outlook.com
Cokri Dridi	0535972814	chokri.dridi@hotmail.com
Abdulrahman AlZughaibi	0504259279	Abdul_@hotmail.com
Saleh Almalki	0534337993	Saleh_077@hotmail.com
Abdullah Basha	0506666558	Abdullahsu7@gmail.com
Fuad Sahal Dabbour	0561015552	Fs.daboor@gmail.com
Abdulkareem Alkhateeb	0535289486	alkhateeba@hotmail.com
Hatem Ahmed Bakharash	0555205033	h.a7med.m@gmail.com
Maimona saeed Algadasi	0562206547	Abdul_568@hotmail.com
customer name	Customer phone	Customer.name@outlook.sa

Table: (16): Meeting Agenda

9.3.2 Identify performance measurement

In SAT, we will be using different measurements to assess the status of the project and improve the implementation process.

As:

- *Gross Profit Margin = (Total Profit-Total Costs)/100*
- *Return on Investment (ROI)*
- *ROI = (Net Benefits/Costs) x 100*
- *Earned Value or the Budgeted Cost of Work Performed (BCWP). This metric provides a reality check during the process of a project*
(EV) = % of Completed Work / Budget at Completion (BAC)
- *Actual Cost (AC) = Total Costs per Time Period x Time Period*
- *Cost Variance (CV) = Budgeted Cost of Work – Actual Cost of Work*

As SAT is a software company, measuring performance in the software development life cycle requires tracking specific metrics for a better understanding of how all the parts of the product development process work together.

However, SAT work in Agile methodology the metrics are indicators that help the company to track throughout the agile development process to monitor a project's quality and consistency and the team's overall performance.

One of the Agile frameworks used in SAT is the KANBAN BOARD which helps SAT team focus on more important parts of the agile development process.

General Agile Metrics.

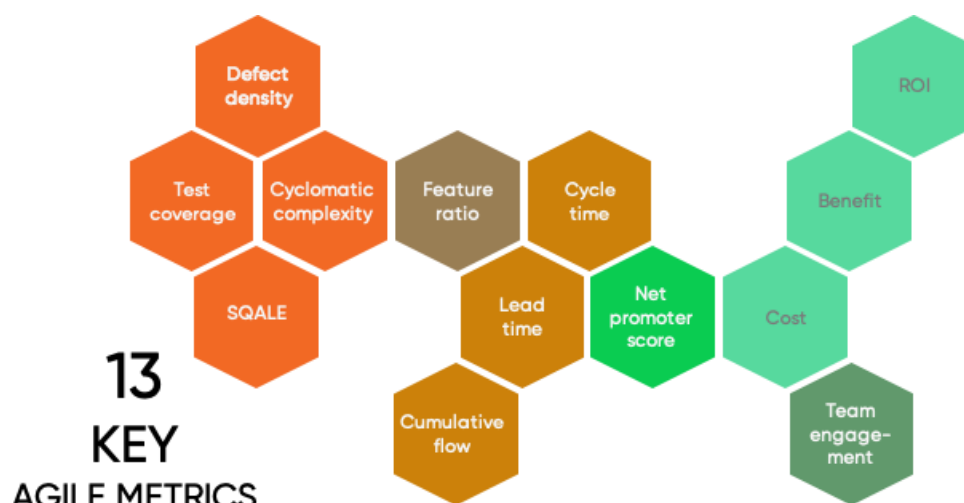


Figure: (34): Agile Metrics

The below list is an example of Agile metrics in SAT

1-Sprint Burndown Chart

The output is measured in terms of hours, story points, or backlogs, allowing the development team to assess the performance against the set parameters.

Burndown Chart

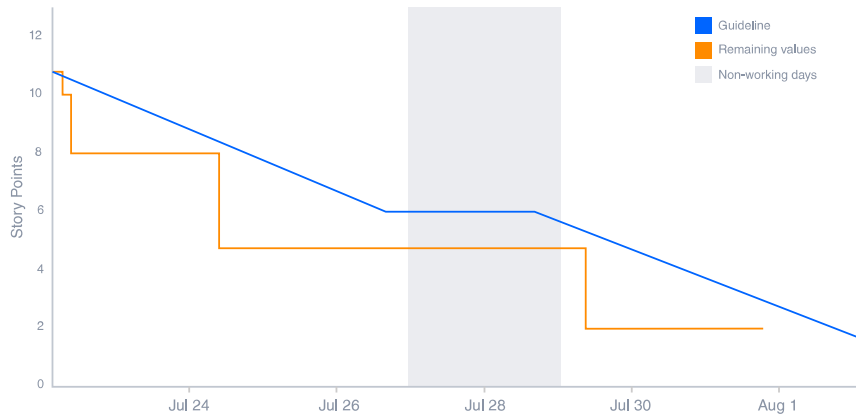


Figure: (35): Burndown Chart

2-Velocity

The output is measured as the number of story points accumulated over the past few sprints is equal to the velocity of the project, and allows teams to predict the amount of work that can be done.

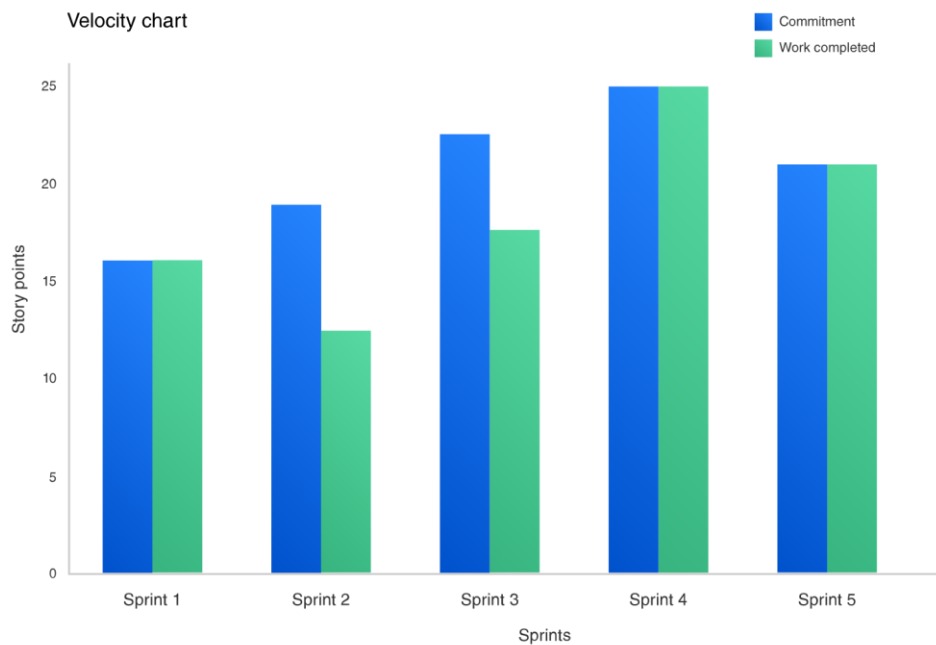


Figure: (36): Team Velocity

9.3.3 Develop Change Request model

CHANGE REQUEST FORM		
Change Description		
Project Name:	Change Designation:	Number:
Smart Parking application,	Special need car detection system	02/2022
Requested By:	Contact - Email:	Date:
Architectures and Compliance depart.	0535972814 chokri.dridi@hotmail.com	17/03/2022
Change Category:	1. Scope X	2. Schedule
	3. Cost	4. Other
Description of Change:		
Increasing sensors capability for special need cars along with camera detection		
Benefits/Reasons for Change:		
Enable special needs resident to find place easily and being tagged by the parking management system		
Priority [check one option]: 1. High X 2. Medium 3. Low		
Project Phase: 01		
Part of Program: Yes/No - Smart Building and retail management system		
Impact on Deliverables:		
New scope of delivering new sensors, increase coverage for other sensors and add new algorithm for camera software to enable detection as specific distances.		
Impact of Not Responding to Change (and Reason Why):		
Special needs resident cannot park on their dedicated places and cannot be detected as entrant to the mall.		
Date Needed: 31.03.2022	Approval of Request: PM steering committee	Date: 28.03.2022
Change Impact		
Tasks/Scope Affected:		
Site survey and design		
New Sensors delivery		
New locations of sensors		
Additional cameras delivery		
New Algorithm for Camera cars detection		
Update in the Parking Management system		
Cost Evaluation:		
Overall increase in the budget of 1.7% comparing to the initial cost base line.		
Risk Evaluation:		
If new sensors performance is not achieved, there will be extra civil work to add a ramp lifting car to higher position of about 25 cm.		
Will engender a delay in the final scope delivery.		
Quality Evaluation:		
Reaching the change goal with a higher performance sensor and detection system is gained thru simulations and root cause analysis for the auditor's report.		
Additional Resources:		
Sensing expert will be assessing the sensor performance during the simulation for 3 days site visit.		
Camera Vendor technical support is supporting via online meetings for a week to support full new algorithm integration.		
Duration: ~ 3 weeks : 1 week for solution provision, 1 week for product shipment, 1 week for simulation and acceptance.		
Additional Effort:		
New cabling installation		
Rerouting existing cable path		
Revisit the site and final test		

Impact on Deadline:	
1 week delay due to logistic lead time	
Alternative and Recommendations:	
PM steering committee also suggest as alternative to Mall management to request special agent to guide special need resident to specific parking place near lift also placing a Helium balloon as visual aid on the free parking lots.	
Comments:	
Customer accepted to have both solution in place with affording the change cost for phase 1 to be in compliance with the Wellbeing authority.	
Sign Offs	
1. Accepted 2. Deferred 3. Rejected 4. More Info Requested	
Comments:	
Based on wellbeing authority report and based on internal audit team finds, its mandatory to go with the changes for the benefit of the program and the end user in general.	
Project Manager Signature:	Date: 29.03.2022
SAT CEO Signature:	Date: 29.03.2022

Table: (17): Change Request

Risk and opportunities

10.1.1 Identify Risks (threats) and opportunities and give examples.

Risk definition is, an uncertain event or condition, that if it occurs, has a positive (opportunity) or negative (threat) effect on a project's objective. The key element of this definition is that the effect of the uncertainty if it occurs, may be positive or negative on the objectives of the planned endeavor.

Risk appetite: Risk appetite is the degree of uncertainty an organization or individual is willing to accept in anticipation of a reward

Risk Threshold: The risk threshold is the level of exposure above which risks are addressed and below which risks may be accepted.

Risk Tolerance: Tolerance is the specified range of acceptable results.

Risk tolerance tells you how much risk an organization or individual can withstand. A high-risk tolerance means they are willing to take more, and a low tolerance means they are unwilling.

Risk tolerance shows the risk attitude of stakeholders or an organization in measurable units.

Several factors affect risk tolerance.

These include how critical the project is, its impacts on profitability, and how the risk will satisfy customers.

Risks examples

Risk Name	Type
Increasing price	Financial
Bodily injury for any employee	Legal liabilities
Remote Internet Speed and Connections	Technology
Not thinking about competitors and market trends	strategic management
Earthquakes	natural disasters

Table: (18): Risk Types

Opportunities	Threats
A potential upcoming change in policy that could benefit your project	Hardware and Software failure
A technology currently being developed that will save you time if released	Human error
A request for additional resources, materials, tools, or training that will make your project more efficient if provided	Viruses and malicious attacks
Investment in IT projects	Natural disasters such as fires, cyclones, or floods
Change in the organization structure will be increase the productivity of employees	Technical failures
	Infrastructure failures

Table: (19): Opportunities and threats

10.1.2 Prepare Risk register.

ID	Risk Description	RBS	Category	Impact	Probability	Priority	Response	Risk Owner
1	Increasing price	External	Budget	Increasing expense 30%	70-80%	High	Mitigate	Finance Department
2	Bodily injury for any employee	Organizational	Schedule	Delay work 2 weeks	5-10%	Low	Accept	HR
3	Remote Internet Speed and Connections	Technical	Technical	Delay schedule,	50-60%	High	Avoid	Technical Department
4	Not thinking about competitors and market trends	Project management	Sales	Decreasing sales 20%	20-30%	Low	Avoid	Project owner
5	Earthquakes	External	External	Infrastructure, cost, schedule	5-10%	Low	Transfer	Logistic Department

Table: (20): Risk Register

10.1.3 Qualitative Risk Analysis

Impact	High	Medium	Medium	High	High
	Medium	Low	Medium	Medium	High
	Low	Low	Low	Low	Medium
		0%-25	26%-50%	51%-75%	76%-100%
	Probability				

Table: (21): Qualitative Risk Analysis

10.1.4 Specify Risk response strategies.

In SAT, different actions could be taken based on the Risks types, as below:

Threats	Opportunities
Avoid	Exploit
Transfer	Share
Mitigate	Enhance
Accept	

Table: (22): Risk Responses

Avoid: This risk response strategy is about removing the threat by any means. That can mean changing your project management plan to avoid the risk because it's detrimental to the project.

Exploit: is the opposite of avoid it's a strategy to ensure a positive impact or realize an opportunity.

Mitigate: Some project risks you just can't avoid. Those you need to mitigate, which is reducing the impact of the negative risk on the project.

Transfer: As the name implies, here you'll transfer or pass the work on resolving the project risk to a third party, such as buying insurance or getting a warranty and guarantee.

Share: sharing a positive risk is allocating ownership of this risk to a third party who is best able to capture the opportunity for the benefit of the project.

Mitigate: it's a strategy to reduce the probability and the impact of a risk as an early action.

Enhance: Where we aim to increase the probability or the impact of an opportunity

Accept: This risk response strategy consists in identifying a risk and documenting all the risk management information about it, but not taking any action unless the risk occurs.

Stakeholder

10.2.1 Prepare Stakeholder engagement assessment matrix.

Stakeholder	Unaware	Resistant	Neutral	Supportive	Leading
Ministry of communications and information technology				D	
Ministry of Finance			C	D	
Ministry of Human Resources and Social Development			C		D
CEO			C		D
Finance manager				C	D
Human Resource manager				C	D
Rami Al Zahrani					CD
Saleh Al Malki			C	D	
Hatem Ahmed				CD	
Fuad Dabbour			C	D	
Maimona				CD	
Abdulrahman Al Zughaibi			CD		
Abdullah Basha			CD		
Dridi Ch.			C	D	
Abdul Kareem			C	D	

Table: (23): Stakeholder engagement

Recommendation

- The use of the agile methodology in project management contributed to the completion of the project tasks by applying the quality control and tasks verification standards by using agile values from (Self-organizing Teams Generate Most Value & Build Projects Around Motivated Individuals), which reflected to improve the concept of teamwork and looking to achieve the project goal
- In order to track and monitor the software development, it's a mandatory to use application and the new technology to ease the process of the implementation, testing and the support for SAT products.
- In addition to that, internal ERP must be use to manage and track the tasks within the organization. Therefore, an IT budget should be accounted as high priority.
- Work on best practices and solutions to reach smarter cities

Conclusion

- The purpose of this project documentation is to apply the standard of IPMA in the life project which helps all team members use IPMA techniques, and competencies to manage and succeed the project.
- The partnership relations should be established first with SAT members, we can't success without having our human capital resource.
- There's a need for such projects as the demand for new products is increasing quickly.

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