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1. Introduction

Public sector organisations responsible for infrastructure development in most non-industrialised countries, which include infrastructure departments/ministries, parastatal organisations and other public bodies qualify as project-oriented organisations (POO). At face value they purport to be fully fledged project-oriented organisations and performing as competent PM organisations, while in reality they are predominantly dependent on “accidental project managers”.

Many individuals find themselves undertaking project management responsibilities with little or no preparation. Referred to as “accidental project managers”, they have no training or experience and must often manage projects while involved in day-to-day operational activities. Due to the surge in projects in the public sector, there is a growing need for government departments to become more responsive to change, and that they are increasingly recognising that the project is an adaptable form of work organisation. The public sector often appoints untrained staff to manage projects whenever there is an unexpected need for project management.

It is reflective of an organisation that is not fully recognising the critical nature of the project management function. There may be a relatively high level of buy-in and political support which indicates a willingness or enthusiasm for project management success but the lack of methodologies and tools implies a lack of preparedness and a lack of sound project management foundation from which to achieve successful project outcomes.

The public sector senior management needs to re-evaluate the way it selects project managers so that individuals with the appropriate skills are chosen to undertake this important role. This includes senior management being more proactive in offering developmental opportunities to both existing and potential project managers. The lack of project management tools, techniques and methodologies should be of concern to organisations and senior managers.

Without proper project management tools, an organisation does not have a strong foundation from which to build skilled project managers, an organisational culture of project management, and ultimately, better outcomes.
2. The need for a project/contract management guideline

The findings from “The Review Report for Proposed Improvement in the Project and Contract Management process for the Procurement Policy Office in the Ministry of Finance and Economic Development for the Republic of Mauritius” drafted in 2015 indicates a clear need for a project/contract management guideline. There are big gaps which need to be filled regarding various project elements listed below.

Issues relating to non-compliance with the rules of legislation can be attributed to a general lack of knowledge with regard to managing projects or proper contract administration. Guidance is required to ensure adherence to the laws, as well as avoiding project/contract cost overruns and delays.

The guidance would enable project/contract managers to better understand the requirements of project management and enable them to manage projects/contract more effectively and efficiently. This includes elements of contract administration best practice.
3. Purpose of the Guideline

The purpose of this Project and Contract management guideline is to help project managers to organise, plan and control projects and contracts. It is designed to help you to maximise the potential for your projects to succeed by helping you address each element of your project at the right time and to the right level of detail for the size and complexity of your project.

To help you manage your projects and contracts, the guideline, which can be applied to any type of project/contract in the organisation and its delivery partners, provides:

- guidance on project management, including
  - an insight into the principles of project management;
  - project prioritisation:
  - an understanding of the different phases of a project life cycle and projects processes required to be managed;
  - project management knowledge areas to steer you through key project management tasks; together with a high-level summary of Inputs, tools and techniques, and outputs for the project management knowledge areas;
  - suggested roles of consultants and public bodies;
  - consideration of construction management commissioning and environmental and land issues; and
  - guidance on claims procedures on projects.

- guidance on contract management, including:
  - Oversight, governance, mechanisms, roles and classification
  - The contract life-cycle
  - Document and Information management
  - Enterprise Contract management; and

The following are not addressed in the guide, but are available from a variety of other sources:

- general project management theory;
- detailed inputs, tools and techniques and outputs for project management knowledge areas;
- access to templates for essential project management documents/forms; and
- the soft skills necessary for effective project management.
4. What is Project Management?

More specifically, what is a project? The Project Management Institute defines a project as “a temporary endeavour undertaken to create a unique product, service or result.”

A project is temporary in that it has a defined beginning and end in time, and therefore defined scope and resources.

A project is unique in that it is not a routine operation, but a specific set of operations designed to accomplish a singular goal. A project team often includes people who do not usually work together – sometimes from different organisations and across multiple geographies.

The development of software for an improved business process, the construction of a building or bridge, the relief effort after a natural disaster, - all are projects. All must be expertly managed to deliver the on-time, on-budget results, learning and integration that organisations need.

Project management, then, is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements; and application and integration of the life cycle phases and processes which fall into four groups:

- Initiation;
- Planning;
- Implementation (Execution), Monitoring and Control; and
- Closure.

The project manager is responsible for managing the project objectives and includes:

- identifying requirements;
- establishing clear and achievable objectives;
- balancing competing demands for quality, scope, time, cost; and
- adapting specifications, plans and approach for changing risks, circumstances and expectations from stakeholders.

Much of the knowledge required is unique to project management; however, the project manager/team also requires an understanding of the following:

- application area knowledge, standards and regulations;
- the project management environment;
- general management; and
- interpersonal skills.

Programs are a collection of projects that are managed in some way to produce a more efficient outcome. The program manager does not manage the specific projects, but rather co-ordinates the outcome of the group of projects by changing their resources, or changing their scope.

Portfolios are organisational-wide collections of projects or programs, where each project/program is initiated in order to achieve the best outcome for the organisation as a whole. Project portfolio management theory is an extension of financial portfolio theory. Portfolios recognise that no organisation has sufficient resources to undertake all of the possible projects that it might want to do.
5. What is a successful project?

To be successful a project must:

- deliver the outcomes and benefits required by the organisation, its delivery partners and other stakeholder organisations;
- create and implement deliverables that meet agreed requirements;
- meet time targets;
- stay within financial budgets;
- involve all the right people;
- make best use of resources in the organisation and elsewhere;
- take account of changes in the way the organisation operates;
- manage any risks that could jeopardise success; and
- take into account the needs of staff and other stakeholders who will be impacted by the changes brought about by the project.
6. Principles of Project Management

Principle 1: Vision and Mission

In order to be successfully executed, every project or initiative should begin with the end in mind. This is effectively accomplished by articulating the Vision and Mission of the project so it is crystal-clear to everyone. Creating a vision and mission for the project helps clarify the expected outcome or desired state, and how it will be accomplished.

Principle 2: Strategic Objectives

The next step is to establish two to three goals or objectives for the project. What is the reason it is being implemented for? Also, it's important to specifically quantify the amount of improvement that is expected, instead of being vague.

Principle 3: Standards of Engagement

Simply put, this means establishing who will be part of the project team? What will be the frequency of meetings? What are the meeting ground rules? Who is the project owner? Who is designated to take notes, and distribute project meeting minutes and action steps? This goes along with any other meeting protocol that needs to be clarified.

Principle 4: Intervention and Execution Strategy

This is the meat of the project and includes using a gap analysis process to determine the most suited intervention (solution) to resolve the issue you are working on. Once the best possible intervention has been identified to resolve the issue, then we must map out our execution strategy for implementing the intervention. This includes identifying who will do what, when, how, and why?

Principle 5: Organisational Alignment

To ensure the success and sustainability of the new initiative or process brought on by this project, everyone it will directly impact must be onboard. To achieve organisational alignment (or buy-in), ongoing communication must be employed in-person during team meetings, electronically via email and e-learning (if applicable), and through training.

Principle 6: Measurement and Accountability

And last, how will we determine success? Accountability means that consistently, top performers will be rewarded and recognised; while those needing improvement will be coached with specific expectations and consequences clearly outlined.
7. Prioritising Projects

7.1. Introduction

Additional investment is needed to expand, update and modernise infrastructure across developed and developing economies to meet the growing demands of consumers and businesses and meet the challenges of climate change. Estimates of the size of the “infrastructure gap” suggest that the financing required significantly outstrips available resources.

It is therefore critical to achieving the international community’s growth, job creation and poverty alleviation goals that governments allocate scarce resources available for infrastructure investment where they will have the greatest impact. With a plethora of competing demands, prioritising investment projects is crucial. This means choosing those investments with the greatest economic potential by achieving the right balance between new infrastructure and operations and maintenance.

Having a sound and transparent prioritisation process is essential for governments, not only to maximise the economic, environmental and social benefits of infrastructure investments, but also to attract additional financing, including from the private sector.

Importantly, this process squarely allocates public resources within the context of a government’s fiscal constraints. An infrastructure plan that has a robust evidence base, has been discussed with a wide group of stakeholders, and has sufficient cross-party political support, is more likely to be preserved after a change of government. A robust long-term infrastructure development plan gives confidence to financiers and construction companies that look for a secure and predictable pipeline of projects. This reduces risks and therefore price premiums.

While infrastructure plans should be specifically tailored to suit the needs of sector and country constraints, there are common principles that can serve as the foundation and provide a guide to decision makers. It is essential to have well-defined, transparent and clear criteria to prioritise projects so that their selection is objective and free of political influence.

The principles set out below are intended to help guide governments in their efforts to prioritise infrastructure activities to enhance the impact of the limited resources spent on infrastructure investment, however may be equally applied to projects of a non-infrastructural nature.
7.2. Principles of Infrastructure Prioritisation

Principle One: A country’s long-term strategic vision should guide the preparation of its infrastructure plan

A country’s sector strategies are both aspirational documents and communication tools that provide the rationale for a country’s program of investments, while each project identified and developed by sector and sub-national agency provides the means by which the strategy can be achieved. Developing a program of infrastructure investment for the next 10+ years that targets the economic, environmental and social goals of the country requires, at a minimum, that each project selected for public support clearly and explicitly aligns with the long-term strategic vision.

Showing the benefits of sector investments for achieving the strategic vision of the country is important to gain political as well as financial support for its execution. Usually, alignment with country vision becomes one of the main criteria for prioritisation.

Principle Two: Robust and transparent selection criteria should maximise economic, social and environmental impact

Governments should adopt cross-cutting, clear and robust selection criteria and a management framework to improve the objectivity, credibility and economic impact of investment decisions. Selecting infrastructure projects requires a thorough understanding of the extent to which society (as a whole and in its constituent parts) will benefit from that investment.

Assessment of the benefits should not only include likely economic benefits and costs, but also social and environmental ones. The latter are usually more difficult to quantify and may require some qualitative data based on perceptions. However, all are fundamental building blocks.

In particular, the economic internal rate of return of a project synthesises the economic value of a project and estimates that value through a cost-benefit analysis (CBA). When the environmental and social cost and benefits can be quantified, they are incorporated in the CBA.

Notably, an important part of assessing benefits from infrastructure is how information is dealt with as part of the decision making process. This is because public investment decisions across infrastructure sectors require the synthesis of large quantities of information that cut across industries, services and population centres, both sectorally and geographically.

Principle Three: Investment plans should consider the entire life-cycle of the assets

Optimising resource allocation for infrastructure investment should take into account costs across the entire life-cycle of an asset including capital costs (CAPEX), routine and periodic maintenance, depreciation and contingency costs.

This type of costing usually requires adaptation of the traditional approach to project procurement, which emphasises that the lowest bid (based on CAPEX alone) is selected. The life-cycle approach requires that a longer-term cost horizon is used, which may result in a bid being selected that does not offer the lowest CAPEX, but provides the greatest financial savings over the life of the asset.
Governments should consider the whole lifecycle cost in the design, building and maintenance of assets as part of their due diligence.

For example, Public-Private Partnership (PPP) arrangements to build and operate an asset shift long-term operation and maintenance responsibilities to the concession company creating a stronger incentive to ensure long-term construction quality because the firm will be responsible for operations and maintenance costs many years down the road. It also encourages more preventative maintenance and reduces the risk of future fluctuations in operations costs.

**Principle Four: Potential network and cross-sectoral impacts should be accounted for**

One of the defining features of infrastructure assets is that they do not operate in isolation, but are part of an intricate system or network. For example, the decision to invest on roads will depend on the conditions of the network of other modes of transportation. Moreover, the decision to invest in a road may have an impact on the cost of expanding transmission lines and/or irrigation systems.

Investments in a platform of urban services may produce economic returns greater than the sum of each individual investment as infrastructure investments may change land usage, productivity levels, settlement patterns and property values. Investment decisions made in isolation may result in excess capacity, redundant assets and wasted resources.

Project evaluators should incorporate cross-sectoral, network effects, and quantify externalities into the project evaluation. Accounting for cross-sectoral impacts and synergies requires an integrated planning process that incorporates the likely spill over effects—both positive and negative—from a particular infrastructure investment. This may require integrative spatial tools, land use modelling and other methodologies that estimate spill over effects of investments that are related spatially or along a supply chain

**Principle Five: Analysis should be based on reliable data**

In order to estimate the infrastructure investment needs of the country and apply prioritisation criteria, it is important to rely on sound and comprehensive databases including financial and non-financial information (e.g., usage rates, population density, infrastructure assets and the quality of the services, inventory of infrastructure unit cost).

Data is costly to collect and update, however it is a cornerstone of asset management. The availability and quality of data will determine the accuracy of the prioritisation process and its outcomes. Many countries generate significant amounts of data but this is not collected with a systematic and standardised approach making difficult its use for future analysis (e.g., data is in paper form, is not categorised and is not in a readily usable format).

Understanding the existing sources of primary and secondary data, the data gaps, as well as developing adequate digital platforms to store, share and process information is the starting point. Updating data and filling the gaps is costly and time consuming and demands a significant allocation of resources. However, the benefits of doing this can pay for the initial outlay many times over by allowing for better selection of projects, and ultimately the commoditisation of certain infrastructure costs (e.g., cost per kilometre of road). Countries approach data collection in different ways.
Principle Six: Support is needed from a wide range of stakeholders and across political parties

Prioritisation criteria, as well as the final infrastructure investment plan, require consultation with a wide range of relevant stakeholders. Having support across political parties is a crucial part of this. A plan that is recognised and supported by a broad audience is more likely to be preserved after a change of administration and this may help lower investment costs. This requires consultation not only during the prioritisation process but also during the preparation and implementation of the projects to get feedback to improve the systems and to ensure and retain stakeholder participation.

Principle Seven: Financing arrangements should be optimised under different budget constraints

The public sector is the largest provider of infrastructure. Notwithstanding, the private sector will continue to play an increasingly crucial role in mobilising financial resources and expertise. An assessment of the optimal structuring of financing for each project should be carried out to define the relative use of public versus private sector financing.

The selection of the appropriate financing instruments depends on the size of the project, the amount and sustainability of its cash flow (e.g., tax payer and/or user fee based), its risk and collateral structure, the creditworthiness of the sponsors, and the legal and regulatory framework that provides procurement guidance. Private sector participation also provides a crucial source of technical and financial innovation, but may create a contingent liability on the public-sector balance sheet.

Developing socially beneficial infrastructure assets that provide for an internal rate of return that is equal to, or greater than, the cost of capital allows private participants to deliver basic services. Such a scenario reduces the direct CAPEX and operational expenditure (OPEX) charges on the public purse and may allow for a more targeted allocation of service costs to the specific users of the delivered service. However, the public balance sheet does incur the obligation, or liability, either directly thought capital grants or other forms of public support, or indirectly through support to debt obligations, revenue or termination payments if a legitimate circumstance arises from the contractual arrangement of the scheme with the private participant. It is therefore important that the public sector develop an adequate capacity for managing its debt, including contingent liabilities before engaging in potentially costly partnerships with financing partners.

Principle Eight: Delivery options should be optimised

The private sector, under certain circumstances, may be able to build, operate and/or maintain an infrastructure asset more efficiently than the public sector. Governments should assess the costs and benefits of delivering through the public or private sector or a combination of both. One way of doing this involves using a public sector comparator to benchmark the cost of public versus private provision, establishing key parameters for comparison such as associated costs of investment, cost of capital and efficiency gains that may be derived in construction, operation and maintenance.

Ultimately, when evaluating the optimal use of government resources, the comparison between private and public sector delivery of the asset throughout its life should determine which of these approaches produces greater savings. This due diligence needs to happen before the decision is made to bid out arrangements such as PPPs. At the end, the decision between public or private delivery...
needs to be determined by the relative benefits to society and the political economy of decision-making. Moreover, the decision needs to be consistent with prudent government fiscal policy and debt management.

**Principle Nine: Institutional and technical capacity should be developed to implement the plan**

Capacity to prepare, evaluate and bring projects to market needs to be considered and a strong methodological framework put in place when developing a comprehensive approach to infrastructure planning. While a country may have the financial resources to fund a pipeline of projects, it may not have the institutional and technical capacity to prepare, develop and/or supervise them efficiently. The reality is that the uneven distribution of technical capability within and across sectors can affect the allocation of resources, with the capacity to prepare or develop some projects compromised, such that some sectors receive insufficient funds from central ministries.

The prioritisation process should not ignore these relative constraints as they are essential to the efficient use of resources. A strong methodological framework to prepare, evaluate and bring projects to market is also needed and should be included as part of a country’s formal project-appraisal methodology. An adequate methodology should become the precondition for

(i) optimising project selection and planning;

(ii) giving a clear mandate to institutions/processes to manage the project cycle and its implementation; and

(iii) ensuring and enhancing public infrastructure project’s credibility and visibility to attract the private sector.

**Principle Ten: Plans should be flexible and adaptable to incorporate feedback**

Monitoring and evaluating the development and implementation of infrastructure projects needs to be an integral part of the implementation of infrastructure plans. This process should allow for the creation of feedback mechanisms that provide the public sector with credible and impartial information to gauge the performance of particular agencies, to identify technical and other gaps and, over time, to link sector transfers to the achievement of certain project-level outcomes.

Determining whether a project has achieved the desired objective in a cost-effective fashion allows decision-makers to recalibrate expectations for the next generation of infrastructure investments. Therefore, flexibility and adaptability over time are crucial to a dynamic process of prioritisation.
8. Project Life Cycle

The project manager and project team have one shared goal: to carry out the work of the project for the purpose of meeting the project’s objectives. Every project has a beginning, a middle period during which activities move the project toward completion, and an ending (either successful or unsuccessful).

A standard project typically has the following four major phases (each with its own agenda of tasks and issues): initiation, planning, implementation, and closure. Taken together, these phases represent the path a project takes from the beginning to its end and are generally referred to as the project “life cycle.” In order to manage effectively it helps to understand the typical life cycle of a project and how it applies to your specific project, you need to decide how the management activities of the lifecycle steps will be achieved, and precisely who will be involved.

You must make sure you understand your role in making these things happen in the right way and at the right time. Much of the project management effort across the life cycle will be driven by the owner/sponsor of the project, and the Project Manager. To achieve success they will almost certainly need to draw upon the skills and experience of many others from within the organisation, its partners and suppliers.

8.1. Initiation phase

During the first of these phases, the initiation phase,

- the project objective or need is identified;
- an appropriate response to the need is documented in a business case with recommended solution options; and
- a feasibility study is conducted to investigate whether each option addresses the project objective and a final recommended solution is determined. Issues of feasibility (“can we do the project?”) and justification (“should we do the project?”) are addressed.

Once the recommended solution is approved,

- a project is initiated to deliver the approved solution and;
- a project manager is appointed;
- the major deliverables and the participating work groups are identified, and the project team begins to take shape; and
- approval is then sought by the project manager to move onto the detailed planning phase.
8.2. Planning phase

The next phase, the planning phase,

- is where the project solution is further developed in as much detail as possible and the steps necessary to meet the project’s objective are planned;
- the team identifies all of the work to be done;
- the project’s tasks and resource requirements are identified, along with the strategy for producing them. This is also referred to as “scope management”;
- a project plan is created outlining the activities, tasks, dependencies, and timeframes; and
- the project manager coordinates the preparation of a project budget by providing cost estimates for the labor, equipment, and materials costs. The budget is used to monitor and control cost expenditures during project implementation.

Once the project team has identified the work, prepared the schedule, and estimated the costs, the three fundamental components of the planning process are complete.

This is an excellent time to identify and try to deal with anything that might pose a threat to the successful completion of the project. This is called risk management. In risk management,

- “high-threat” potential problems are identified along with the action that is to be taken on each high-threat potential problem, either to reduce the probability that the problem will occur or to reduce the impact on the project if it does occur.

This is also a good time to

- identify all project stakeholders and,
- establish a communication plan describing the information needed and the delivery method to be used to keep the stakeholders informed.

Finally, you will want to document a quality plan,

- providing quality targets, assurance, and control measures,
- along with an acceptance plan, listing the criteria to be met to gain customer acceptance.

At this point, the project would have been planned in detail and is ready to be executed.
8.3. Implementation (execution), monitoring and control phase

During the third phase, the implementation, monitoring and control phase,

- the project plan is put into motion and the work of the project is performed. It is important to maintain control and communicate as needed during implementation; and
- progress is continuously monitored and appropriate adjustments are made and recorded as variances from the original plan. *In any project, a project manager spends most of the time in this step.*

During project implementation,

- people are carrying out the tasks and,
- progress information is being reported through regular team meetings.

The project manager uses this information to maintain control over the direction of the project

- by comparing the progress reports with the project plan to measure the performance of the project activities and take corrective action as needed. The first course of action should always be to bring the project back on course (i.e., to return it to the original plan).

If that cannot happen,

- the team should record variations from the original plan and record and publish modifications to the plan;
- project sponsors and other key stakeholders should be kept informed of the project’s status according to the agreed-on frequency and format of communication.

The plan should be updated and published on a regular basis.

Status reports should always emphasise,

- the anticipated end point in terms of cost, schedule, and quality of deliverables;
- each project deliverable produced should be reviewed for quality and measured against the acceptance criteria.

Once all of the deliverables have been produced and the customer has accepted the final solution, the project is ready for closure.
8.4. Closing phase

During the final closure, or completion phase,

- the emphasis is on releasing the final deliverables to the customer;
- handing over project documentation to the business;
- terminating supplier contracts;
- releasing project resources; and
- communicating the closure of the project to all stakeholders.

The last remaining step is to conduct lessons-learned studies to examine what went well and what did not. Through this type of analysis, the wisdom of experience is transferred back to the project organisation, which will help future project teams.
### 9. Project Management knowledge areas

Project management *knowledge* (based on PMBOK) draws on ten areas, and involves various processes:

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9.1. Project integration management

Project Integration Management is the processes and activities needed to identify, define, combine, unify, and coordinate activities within the Project Management Process Groups. It involves making trade-offs among competing objectives and alternatives to meet or exceed stakeholder needs and expectations.

To help you better co-ordinate and manage the various elements of the project, there are four keys to integration management:

- Get Buy-In
- Create a Plan of Attack
- Be Willing to Make Tradeoffs
- Learn From Your Mistakes (And Successes)

9.1.1. Get Buy-In

For integration management to be effective, you need to get buy-in from key stakeholders and team members. Getting buy-in from the get go will ensure that your project receives the support and funding needed for it to be successful. To get buy-in, start by creating a project charter and a preliminary scope statement.

The project charter initiates the project and includes:

- the necessary approvals and sanctions;
- it gives the project manager authority to act and apply organisational resources to the project; and
- defines the objectives and participants in a project, with the preliminary delineation of roles and responsibilities.

Along with the project charter, you will need to develop a preliminary scope statement, which includes:

- a high-level definition of the project scope and defines the reasons for undertaking the initiative;
- the objectives and constraints of the project;
- directions concerning the solution;
- identifies the main stakeholders;
- defines the project's product or service;
- methods for approval; and
- tactical strategies for the change control process.

With the project charter and preliminary scope statement in hand, you have the ammunition, and most importantly, the authority to guarantee that resources are coordinated and scheduled in the manner and time you request.
9.1.2. Create a Plan of Attack

Now that you have a project charter and the objectives of the project have been clearly defined, it is time to create a plan of attack. This is done in the form of a project plan.

Start by identifying the activities needed to effectively execute, manage, and monitor the project.

Project management software can really help with this step and allows you to plan and monitor the project from anywhere at any time. The software helps you create the project timeline and tasks, allocate the required resources, and get the day-to-day status updates needed to effectively manage the project. As you develop your plan, verify that your team is all on the same page. Make sure each team member can login to the project management software and ensure that they all know how to update their task completion status. Performing this simple step will make reporting and monitoring more accurate and timely.

9.1.3. Be Willing to Make Tradeoffs

One of the biggest challenges you will face in executing the project is managing people, their opinions, and the changes they request. For you to be effective, you must be willing to make tradeoffs. Everybody won’t get everything they want, but the project should meet the objectives and requirements established in the project charter.

Orchestrate how the team implements the project plan and make sure they complete the work required in the Project Scope Statement. Monitor and control the project work by measuring and balancing the progress of the project. Take corrective or preventative actions as needed to assure that all objectives are being met.

Use the pre-established process for change requests and ensure that all changes go through the proper channels before they become a part of the plan. Evaluate all change requests and approve those changes that will help you meet the project objectives. Only validated and approved changes should be implemented.

9.1.4. Learn From Your Mistakes (And Successes)

Hopefully, before you ever started the project, you clearly defined what it means for the project to be complete. As you finish up, verify that all of the project activities are complete and that the final product or service meets the expectations of the client and/or stakeholders. Obtain a written approval of the project completion. Once the project has been formally closed, it is now time to learn from your mistakes and successes.

Arrange a formal review meeting and hold a brainstorming session where you list all of the mistakes made during the project. Now make a list of all the things that went right. How can you learn from this experience? What are the takeaways from project and how can you prepare for these challenges in your next project? This exercise will build team camaraderie and will help you be more effective in your next project.
9.2. Project Integration Management processes

The knowledge area of Project Integration Management consists of the following seven processes -

**Project Integration Processes**

<table>
<thead>
<tr>
<th>Process</th>
<th>Project Phase</th>
<th>Key Deliverables</th>
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</thead>
<tbody>
<tr>
<td>Develop Project Charter</td>
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<tr>
<td>Develop Preliminary Scope Statement</td>
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<tr>
<td>Develop Project Management Plan</td>
<td>Planning</td>
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</tr>
<tr>
<td>Direct and Manage Project Work</td>
<td>Execution</td>
<td>Deliverables</td>
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<tr>
<td>Monitor and Control Project Work</td>
<td>Monitoring and Control</td>
<td>Change Requests</td>
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<tr>
<td>Perform Integrated Change Control</td>
<td>Monitoring and Control</td>
<td>Change Requests status updates</td>
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<tr>
<td>Close Project or Phase</td>
<td>Closure</td>
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9.2.1. Develop Project charter process

The first of these processes is the development of the project charter. The project charter initiates the project. This document authorises the project to get underway. Project charters state the project objectives and name the project manager. A project charter describes what your project is and how you will approach it, and it lists the names of all stakeholders. It is a critical component of the project management initiation and planning phases, and you will refer to it throughout the life of the project. The Inputs, Tools and Techniques and Output of the Develop Project Charter process are given below.

**Develop Project Charter process**

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools &amp; Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Statement of work</td>
<td>Project selection methods</td>
<td>Project Charter</td>
</tr>
<tr>
<td>Business case</td>
<td>Project management methodology</td>
<td></td>
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<td>Contract</td>
<td>Project Management Information system</td>
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<td>Enterprise environmental factors</td>
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<td>Organisational process assets</td>
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9.2.2. Defining the Project Charter

When you start a project, you must define what needs to be accomplished; and decide how the project is going to proceed. Each project begins with an idea, a vision, or a business opportunity - and that is the starting point that must be associated with your organisation’s business objectives.

The project charter is that starting point. The charter lays the foundation of the project. It includes a statement of your business's needs. What is the history that has led to the need? How was it recognised, and why is it planned now?

Next, you must stipulate the project's purpose. How will you reach your goals? What deliverables can you promise? What are the risks? You must identify your project resources and technologies, and reflect on task dependencies. It is also important to define your indicators of success.

Last, you must tie this in to the roles and responsibilities of your project team. You must define resources - both human and material - and specify whom or what will fill them. The charter forms a contract with all stakeholders involved in the project.

The project charter is a single, consolidated source of information about the project in terms of initiation and planning. The project charter defines the boundaries of the project, no matter what type of project management methodology you are using. It is much more than an effective planning tool. It serves both as anchor, holding you to your objectives, and as navigator, guiding you through the milestones that will mark your progress. The original project charter will not change throughout your project's life cycle. Once it is approved by the stakeholders, you cannot modify or change the original charter without agreement by all parties involved.

9.2.3. What Does the Project Charter Include?

What should be included in your project charter contents? Along with outlining a list of sections that should be a part of almost every project charter, this guide gives a brief description of these sections and explains the importance of each component.

A project charter is one of many project management forms used in the initiation and planning stages of project management—and one of the most crucial documents. Proper construction of a project charter can help ensure the success of any project and, likewise, taking shortcuts in the preparation of this all-important document can subject your project to numerous pitfalls and unnecessary hold-ups. So, what should you be sure to include in this form?
Every project charter should consist of at least three primary components:

- **Project Overview Section**
- **Project Approach Section**
- **Project Approval Section**

The following guidelines will take a closer look at the items that should be detailed in each of these sections and give a brief explanation of why that information is needed.

### 9.2.3.1. **Project Overview Section**

1. **Identification (Project Formal Name):** Give the formal name of the project as well as any other terms that might be used to identify the project and the primary groups that will be involved with it. With this consistent terminology, it will be easier for all parties involved—such as the project team, stakeholders, and end users—to discuss and work on the project.

2. **Project Background and History:** Give any background information that will help explain how the project came to be.

3. **Project Purpose and/or Business Need:** Explain why the project is needed. If applicable, include details of why existing tools or products are inadequate. If you have supporting documents for any of these reasons, you can list them here and include them as appendices to the charter.

4. **Project Scope and Limitations:** Define the project scope, being careful to note boundaries and limitations. The project scope should be clearly detailed so that all parties involved are very aware of exactly what the project includes as well as what it does not.

5. **Project Goals and Objectives:** Using appropriate business terminology, state all objectives for the project. Be sure to include the project's intended purpose in language that is both concise and explanatory.

6. **Project Sponsorship and Major Stakeholders:** Provide a list of names identifying the major parties involved in the project, such as project sponsors, stakeholders, and eventual project owners. In addition, be sure to identify the role of each individual listed so that there is no confusion concerning responsibilities later down the line. These names should also be included in the Project Approval section—see the next page of this guide for more details on that section of the project charter.

7. **Pertinent Documents and References:** List any related documents or other resources that could be helpful in understanding various aspects of the project, such as the scope and business need. If these documents are particularly crucial, they can also be included as appendices to the charter.

8. **Overview of Project Terminology:** Provide a basic, but complete, glossary that defines special terms related to the project. If there are any key terms, phrases, or acronyms that might prove to be confusing or new to anyone related to the project, be sure to include them in this section.
9.2.3.2. Project Approach Section

A project charter should also include a Project Approach section, which gives a high-level overview of how and when the project will be completed. Several standard components normally comprise this section. In the following section are eight key components determined to be the most important.

1. Project Deliverables: List the major deliverables of the project and include when these goals should be achieved. Most importantly, remember to include the key milestones of the project.

2. Responsibilities and Roles: Include a summary of all parties that will be involved in the project and what their roles will be. Also, list the needed skills and expertise that each individual brings to the project as well as each person's responsibilities.

3. Project Resources: In addition to the human component, what other resources will be needed for satisfactory completion of the project? Provide a list of computer equipment, raw materials, working space, and any other resources that might be taxed during the project's life cycle. If certain resources will only be needed during specific phases of the project, make note of that as well.

4. Risk Management Overview: Give a summary of the risks that may be encountered during the project as well as how these risks may be minimised. Risk mitigation and action steps can be listed.

5. Project Process Summary: Explain which of your organisation's project management methodologies will be employed for this project. If you plan to deviate from standard means and methodologies, explain that as well.

6. Project Life Cycle Overview: Give a basic breakdown of the project life cycle, and list the various stages that your project will go through. Make sure to include the objectives of each stage; and why the stage is necessary.

7. Basic Project Control and Communication Plan: The project control component explains the tools that will be used to assist the project manager in tracking the project's progress. It also serves as a communication device for communicating the project's progress to the project team, project sponsor, and project stakeholders.

8. Project Schedule: Provide a basic schedule overview that lists, among other things, the key milestones and stages of the project. Various exhibits, such as a Gantt chart (including the associated Work Breakdown Structure) should be included in this section. Here, it can be quite advantageous to use a project management software tool to produce a schedule that can be monitored and adjusted as the project progresses. Depending on the size of the project, such tools can be critical to its success.
9.2.3.3. Project Approval Section

The Approval section of a project charter may be the simplest section to put together, but it is one of the most critical in terms of the project's eventual success. This section should list all of the names and roles of the major stakeholders along with their signatures, indicating that each of these individuals is satisfied with the details included in the project charter.

In addition, if the project will require resources from other departments or groups, a representative from each of these divisions should be listed in the Approval section as well. The signatures of these individuals will signify that they accept their own responsibilities for successful completion of the project and agree to provide needed support.

9.2.4. Who Is Responsible for the Project Charter?

With a well-designed project charter you will realise benefits such as improved client partnerships and other relationships. Communication with project owners and external stakeholders will flourish, and your sponsors will buy in to your project more eagerly. You can expect defined project management processes to run more fluidly. With universal recognition of the senior manager, you will achieve on-time and on-budget delivery of goals.

During project execution, the project team focuses on completing the tasks assigned. The Senior Management protects the project from changes and loss of resources. The Project Manager integrates all the pieces into the project as a whole.
9.3.1. **Develop Preliminary Scope Statement**

The second process of project integration management is the development of the preliminary scope statement. The scope statement defines “what-is” and “what-is-not” a part of the project. Well-defined scope statements will list all and only the work involved with a specific project. The purpose of the Preliminary Project Scope Statement is to identify the high-level project objectives. The objectives must be clear, actionable and measurable. The Inputs, Tools and Techniques and Outputs of the Develop preliminary project scope process is given below.

**Develop Preliminary Project Scope Statement process**

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools &amp; Techniques</th>
<th>Outputs</th>
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<tbody>
<tr>
<td>Project charter</td>
<td>Expert judgment</td>
<td>Preliminary project scope statement</td>
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<tr>
<td>Project Statement of work</td>
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<td>Enterprise environmental factors</td>
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<td>Organisational process assets</td>
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Recommended sections for the Preliminary Project Scope Statement include:

1. **Project Description:** Explain what the project is, and how it will be accomplished. Explain the ultimate intended outcome of the project. This should serve as a brief introduction. Provide some background about the history of how the project got to this point.

2. **Project Purpose:** State the purpose of the project. Tie the purpose to the organization’s strategic goals and objectives if possible. Tell the reader why this project is being started and what need it is fulfilling. Identify if there are any specific mandates, policies or laws that are driving this change.

3. **Project Objectives:** Provide clear, actionable and measurable objectives of the project. The objectives should be clear enough so that the project can be measured against the objectives once completed. The ultimate success of a project is whether the project achieved its stated objectives. Take time to clearly document the objectives here.

An example of an objective is:

*The system/product/service will cut processing times by 50%, thus allowing the organization to process twice as many tickets.*

4. **Project Requirements:** Identify the high-level requirements of the product or service that will be developed. Remember that this is not a detailed list of system requirements or specifications at this point. The requirements might be at a level that is sufficient for performing an alternatives analysis to identify vendors and service providers that can meet the requirements.
An example of a requirement is:

*The system will provide users with the ability to create and maintain a login account and profile online.*

If you have elicited enough requirements where it makes sense to group the requirements by category, then feel free to display the requirements by category. Generally, there are two types of requirements: functional and non-functional. Non-functional requirements are generally broken into groups like security, usability, quality, scalability, privacy, maintainability, etc.

5. **Project Assumptions:** Assumptions are conditions at the start of the project that must be considered. For example, when developing the new software system that is going to take 3 years to fully complete, an assumption could be that the project budget is approved each year for three years so that the project scope is not impacted.

6. **Project Constraints:** Constraints are situations or events on the ground that must be considered and accounted, for which the project has no control over. For example, a constraint can be a hard deadline or completion date. Other constraints could be resources, tools or hardware - so that if the project has no budget for additional servers, then the project must find a way to develop the new system using the hardware already in place. This could mean juggling servers to fit specific development environment needs while ensuring that the production environment stays up.

7. **Project Boundaries:** If the product or system boundary is known, describe it here. For example, if a system requires access to multiple external systems (e.g., a system of systems), then it might make sense to break the scope of work into multiple phases so that the scope of the first phase of development would be to only develop the core functionality. A later phase would integrate the remaining functions. In this scenario, you essentially could have two projects. Therefore, clearly defining the project boundaries helps set the scope of work that is to be accomplished.

An example of a system boundary concept is:

*The online store will integrate with the shopping cart and credit card purchasing modules for the initial release. The second release will contain social media integration modules.*

8. **Project Risks:** State the known risks. These risks are generally at a high level since not much is known about the details of the project yet. If a Benefit-Cost Analysis was performed, then risks identified during the Benefit Cost Analysis should be placed here.

For example, if the project is going to span 5 years and touch multiple third-party systems, then integration and technology change would be risks to consider here.

9. **Project Deliverables:** Identify the products and services that the project will deliver. The intent of this section is to list the product or system deliverables (e.g., an online shopping site), and not the project management deliverables (e.g., Requirements Management Plan)

An example of a product deliverable is:

*An online store with a shopping cart and credit card purchasing capability.*
10. **Project Milestones:** Identify the project milestones.

<table>
<thead>
<tr>
<th>Milestone Date</th>
<th>Milestone Name</th>
<th>Milestone Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Jan 1]</td>
<td>System Requirements Complete</td>
<td>System requirements version 1.0 is approved and baselined so that the project can begin design and development.</td>
</tr>
<tr>
<td>[June 1]</td>
<td>Development Complete</td>
<td>Software development is complete and ready for integration testing</td>
</tr>
<tr>
<td>[Dec 1]</td>
<td>Deployed to Production</td>
<td>System passes integration and end-user acceptance testing and is deployed to production</td>
</tr>
</tbody>
</table>

11. **Project High Level Work Breakdown Structure (WBS):** If you have decomposed the high-level work that needs to be done, then provide the high-level work breakdown structure (WBS) here. A high level WBS is sometimes referred to as a Rough Order of Magnitude WBS, or ROM WBS.

12. **Rough Order of Magnitude (ROM) Estimate:** Provide ROM estimate information here. If the work has been decomposed and a ROM estimate calculated, then provide the information here.
9.4.1. Develop Project plan

The third process is the development of the project plan. The project plan includes the project charter, the definition of the project, project objectives, the project budget, the project schedule, the resources required for the project, the approach, management plans, and the initial risk assessment. The Inputs, Tools and Techniques, and Outputs of the Develop Project Management Plan process are given in the table below.

Develop Project Management Plan process

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools &amp; Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project charter</td>
<td>Expert judgment</td>
<td>Project Management Plan</td>
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<tr>
<td>Outputs from planning processes</td>
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<tr>
<td>Enterprise environmental factors</td>
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<tr>
<td>Organisational process assets</td>
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A Project Management Plan is developed by Project Manager with inputs from the team, stakeholders and management. Project Management Plan development is iterative. A Project Management Plan is bought into, approved, realistic and formal. A Project Management Plan includes:

1. Project Charter
2. Budget
3. Schedule
4. Resources
5. Scope Statement
6. WBS
7. Responsibility charts/assignments
8. Management Plans

A Project Management Plan consolidates other management plans. These are:

9. Scope management plan
10. Requirement management plan
11. Schedule management plan
12. Cost management plan
13. Quality management plan
14. Process improvement plan
15. Human resource plan
16. Communication management plan
17. Risk management plan
18. Procurement management plan

The Project Management Plan also includes project baselines. These are:

19. Schedule baseline
20. Cost performance baseline, and
21. Scope baseline.

**Project baseline** refers to the original version of the project management plan. Once the project management plan is baselined, it may only be changed by raising a change request. Baselines are sometimes called performance measures, because the performance of the entire project is measured against them. They are the project's three approved starting points and include the scope, schedule, and cost baselines. These provide the 'stakes in the ground.' That is, they are used to determine whether the project is on track, during the execution of the project.

**Baseline management plans** include documentation on how variances to the baselines will be handled throughout the project. Each project baseline will need to be reviewed and managed. A result of this process may include the need to do additional planning, with the possibility that the baseline(s) will change.

Project management plans document what the project team will do when variances to the baselines occur, including what process will be followed, who will be notified, how the changes will be funded, etc.
One of the critical factors for project success is having a well-developed project plan. The following is a 10-step approach to creating the project plan, not only showing how it provides a roadmap for project managers to follow, but also exploring why it is the project manager's premier communications and control tool throughout the project.

Step 1: **Explain the project plan to key stakeholders and discuss its key components.** One of the most misunderstood terms in project management, the project plan is a set of living documents that can be expected to change over the life of the project. Like a roadmap, it provides the direction for the project. Moreover, like the traveller, the project manager needs to set the course for the project, which in project management terms means creating the project plan. Just as a driver may encounter road construction or new routes to the final destination, the project manager may need to correct the project course as well.

A common misconception is that the plan equates to the project timeline, which is only one of the many components of the plan. The project plan is the major work product from the entire planning process, so it contains all the planning documents for the project.

Typically, many of the project's key stakeholders, that are those affected by both the project and the project's result, do not fully understand the nature of the project plan. Since one of the most important and difficult aspects of project management is getting commitment and buying, the first step is to explain the planning process and the project plan to all key stakeholders. It is essential for them to understand the importance of this set of documents and to be familiar with its content, since they will be asked to review and approve the documents that pertain to them.

Step 2: **Define roles and responsibilities.** Not all key stakeholders will review all documents, so it is necessary to determine who on the project needs to approve which parts of the plan. Some of the key players are:

- **Project sponsor**, who owns and funds the entire project. Sponsors need to review and approve all aspects of the plan.

- **Designated business experts**, who will define their requirements for the product. They need to help develop the scope baseline and approve the documents relating to scope. They will be quite interested in the timeline as well.

- **Project manager**, who creates, executes, and controls the project plan. Since project managers build the plan, they do not need to approve it.

- **Project team**, who build the product. The team needs to participate in the development of many aspects of the plan, such as identifying risks, quality, and design issues, but the team does not usually approve it.

- **End users**, who use the end product. They too, need to participate in the development of the plan, and review the plan, but rarely do they actually need to sign off.

- **Others**, such as auditors, quality and risk analysts, procurement specialists, and so on may also participate on the project. They may need to approve the parts that pertain to them, such as the Quality or Procurement plan.
Step 3: **Hold a kick-off meeting.** The kick-off meeting is an effective way to bring stakeholders together to discuss the project. It is an effective way to initiate the planning process. It can be used to start building trust among the team members and ensure that everyone’s idea is taken into account. Kick-off meetings also demonstrate commitment from the sponsor for the project. Here are some of the topics that might be included in a kick-off meeting:

- Business vision and strategy (from sponsor)
- Project vision (from sponsor)
- Roles and responsibilities
- Team building
- Team commitments
- How team makes decisions
- Ground rules
- How large the group should be and whether sub-groups are necessary

Step 4: **Develop a Scope Statement.** The Scope Statement is arguably the most important document in the project plan. It is the foundation for the rest of the project. It describes the project and is used to get common agreement among the stakeholders about the scope. The Scope Statement clearly describes what the outcome of the project will be. It is the basis for getting the buy-in and agreement from the sponsor and other stakeholders and decreases the chances of miscommunication. This document will most likely grow and change with the life of the project.

The Scope Statement should include:

- Business need and business problem
- Project objectives, stating what will occur within the project to solve the business problem
- Benefits of completing the project, as well as the project justification
- Project scope, stated as which deliverables will be included and excluded from the project.
- Key milestones, the approach, and other components as dictated by the size and nature of the project.
- It can be treated like a contract between the project manager and sponsor, one that can only be changed with sponsor approval.

The details required in the Scope Statement are dealt with later under Section 9.5 Scope Management.
Step 5: **Develop scope baseline.** Once the deliverables are confirmed in the Scope Statement, they need to be developed into a work breakdown structure (WBS), which is a decomposition of all the deliverables in the project. This deliverable WBS forms the scope baseline and has these elements:

- Identifies all the deliverables produced on the project, and therefore, identifies all the work to be done.
- Takes large deliverables and breaks them into a hierarchy of smaller deliverables. That is, each deliverable starts at a high level and is broken into subsequently lower and lower levels of detail.
- The lowest level is called a "work package" and can be numbered to correspond to activities and tasks.
- The WBS is often thought of as a task breakdown, but activities and tasks are a separate breakdown, identified in the next step.

Step 6: **Develop the schedule and cost baselines.** Here are the steps involved in developing the schedule and cost baselines.

1. Identify activities and tasks needed to produce each of the work packages, creating a WBS of tasks.
2. Identify resources for each task, if known.
3. Estimate how long it will take to complete each task.
4. Estimate cost of each task, using an average hourly rate for each resource.
5. Consider resource constraints, or how much time each resource can realistically devoted to this project.
6. Determine which tasks are dependent on other tasks, and develop critical path.
7. Develop schedule, which is a calendarisation of all the tasks and estimates. It shows by chosen time period (week, month, quarter, or year) which resource is doing which tasks, how much time they are expected to spend on each task, and when each task is scheduled to begin and end.
8. Develop the cost baseline, which is a time-phased budget, or cost by time period.

This process is not a one-time effort. Throughout the project you will most likely be adding to repeating some or all of these steps.

Step 7: **Create baseline management plans.** Once the scope, schedule, and cost baselines have been established, you can create the steps the team will take to manage variances to these plans. All these management plans usually include a review and approval process for modifying the baselines. Different approval levels are usually needed for different types of changes. In addition, not all new requests will result in changes to the scope, schedule, or budget, but a process is needed to study all new requests to determine their impact to the project.
Step 8: Develop the staffing plan. The staffing plan is a chart that shows the time periods, usually month, quarter, year, that each resource will come onto and leave the project. It is similar to other project management charts, like a Gantt chart, but does not show tasks, estimates, begin and end dates, or the critical path. It shows only the time period and resource and the length of time that resource is expected to remain on the project.

Step 9: Analyse project quality and risks.

Project Quality: Project quality consists of ensuring that the end product not only meets the customer specifications, but is one that the sponsor and key business experts actually want to use. The emphasis on project quality is on preventing errors, rather than inspecting the product at the end of the project and then eliminating errors. Project quality also recognises that quality is a management responsibility and needs to be performed throughout the project.

Creating the Quality Plan involves setting the standards, acceptance criteria, and metrics that will be used throughout the project. The plan, then, becomes the foundation for all the quality reviews and inspections performed during the project and are used throughout project execution.

Project Risks: A risk is an event that may or may not happen, but could have a significant effect on the outcome of a project, if it were to occur. For example, there may be a 50% chance of a significant change in funding in the next few months. Analysing risks includes making a determination of both the probability that a specific event may occur and if it does, assessing its impact. The quantification of both the probability and impact will lead to determining which are the highest risks that need attention. Risk management includes not just assessing the risk, but developing risk management plans to understand and communicate how the team will respond to the high-risk events.

Step 10: Communicate! One important aspect of the project plan is the Communications Plan. This document states such things as:

- Who on the project wants which reports, how often, in what format, and using what media?
- How issues will be escalated and when?
- Where project information will be stored and who can access it.
- For complex projects, a formal communications matrix is a tool that can help determine some of the above criteria. It helps document the project team’s agreed-on method for communicating various aspects of the project, such as routine status, problem resolution or decision-making, etc.

Once the project plan is complete, it is important not just to communicate the importance of the project plan to the sponsor, but also to communicate its contents once it is created. This communication should include such things as:

- Review and approval of the project plan.
- Process for changing the contents of the plan.
- Next steps - executing and controlling the project plan and key stakeholder roles/responsibilities in the upcoming phases.
The fourth process involved is the directing and monitoring of project execution. This is when the project really gets underway. Items produced during this phase include the final deliverable product. Direct and Manage Project Work process includes performing the work defined in the PMP to achieve project goals. The Input, Tools and Techniques and Outputs of this process are given below.

**Direct and Manage Project Work process**

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools &amp; Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project management plan</td>
<td>Expert judgment</td>
<td>Deliverables</td>
</tr>
<tr>
<td>Approved change requests</td>
<td>Project management information system</td>
<td>Work performance information</td>
</tr>
<tr>
<td>Enterprise factors</td>
<td>Organisational process assets</td>
<td>Change requests</td>
</tr>
</tbody>
</table>

As easy as it seems to keep a well-planned project on-track, it is not! Projects do not fail in formulation; they fail in execution. The best results follow those projects that are well-managed and kept on-track. Results are not just substantial in terms of monetary gain, but are also important to customer satisfaction and service delivery.

There are several powerful strategies to keeping a project on track. Some of the most impactful are as follows:

1. **It starts at the top:** As with success overall, keeping your project on track starts at the top. Leaders can make or break success. Thus, selecting the best project manager is key to success. Of course, it is beneficial also to have the best project sponsors and executive support; however, the 80/20 of success is putting the right leader in place.

2. **Put time in upfront to understand the project plan:** Although it is a common desire to jump into the project and start performing tasks, it is significantly more successful to take the time to develop a strong project plan. Make sure to coordinate with all relevant parties and incorporate input. Ask questions and consider potential issues. Be clear on your plan, and results will follow.

3. **Focus on the critical path:** One of the secrets to success relates to focusing exclusively on the critical path. It is easy to get deterred on all the project plan tasks as they all seem important; however, the most successful projects consider the 80/20 as the critical path. In essence, the focus is on the tasks that are most likely to hold up the project from progressing at the optimal pace and those which are likely to impact whether results occur.

4. **Follow up with task owners:** Following up with task owners can ensure success. I’ve found that a quick check in with task owners to remind them of upcoming tasks, especially critical path
tasks, can be invaluable to making sure the owner is prepared to start on time and that they have the resources available to successfully complete the task. Ask if there are any concerns and work to address them prior to the start date.

5. **Embrace project supporters:** Whether a project sponsor or a peer to the project team, project supporters are integral to project success. Identify project supporters and keep them in the loop. Make sure to provide information so that they understand how they help to contribute to the project success. Make it easy for them to support your project.

6. **Celebrate successes:** An important part of any project is to celebrate small wins along the way. Do not wait for the project to be completed to celebrate success. Success breeds success. Find people doing right. Look for indicators that the project is moving in the right direction. Recognise the progress and celebrate the contributions of the team.

7. **Simplify:** Complex project plans do not deliver success. Contrary to popular opinion, more often than not, success stems from simplification. Simplify the tasks required to deliver your end result. Avoid complexity. It will become easier for the team to understand and execute.

8. **Monitor metrics:** Do not wait until the end to evaluate project success. Identify milestones. Keep an eye out for critical path milestones. Monitor progress towards these milestones. For the critical milestones, develop interim checkpoints so that you can monitor progress along the way. That way, you will have the opportunity to adjust as needed.

9. **Don’t take your eye off the prize - results:** Although it is easy to get caught up in a maze of tasks and to-do’s, don’t take your eyes off of your desired end results. Keep them in mind and focus on those actions that will contribute specifically towards delivering end results.

10. **Communicate, communicate and communicate:** Just as in real estate where location, location and location are the three most important attributes of a new house, communicate, communicate and communicate are the three most important attributes in keeping your project on track. If not all team members, supporters, sponsors and other related parties are aligned, the project is likely to veer off track.

Since politicians count on projects to deliver the vast majority of improvements to government service delivery and performance, keeping the project on track is essential. Those who follow these ten strategies will succeed significantly more often than those who do not.
Fifth, project work must be monitored and controlled. One important aspect of this process is change management. Requests for project change may be made during the project lifecycle. If these requests are not monitored and controlled, then the quality of the project may be compromised. A team must be formed in order to oversee requests for change and implementation of change. Monitor and Control project work process includes tracking and reviewing the progress of the project. The Input, Tools and Techniques and Outputs of this process are given below.

**Monitor and Control project work process**

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools &amp; Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project management plan</td>
<td>Expert judgment</td>
<td>Change requests</td>
</tr>
<tr>
<td>Performance reports</td>
<td></td>
<td>Project management plan updates</td>
</tr>
<tr>
<td>Enterprise environmental factors</td>
<td></td>
<td>Project document updates</td>
</tr>
<tr>
<td>Organisational process assets</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This process is closely related to the sixth: the control of integrated change. The change requests that get generated are evaluated as part of the Perform Integrated Change Control process. The change requests on the project deliverables and project artefacts are managed in this process. The Input, Tools and Techniques and Outputs of this process are given below.

**Perform Integrated Change Control process**

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools &amp; Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project management plan</td>
<td>Expert judgment</td>
<td>Change request status updates</td>
</tr>
<tr>
<td>Work performance information</td>
<td>Change control meetings</td>
<td>Project management plan updates</td>
</tr>
<tr>
<td>Change requests</td>
<td></td>
<td>Project document updates</td>
</tr>
<tr>
<td>Enterprise environmental factors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organisational process assets</td>
<td></td>
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</tbody>
</table>

A Change Control Board needs to be formed to review change requests. It is used to approve or reject change requests. After the project scope has been baselined, each requested change must go through a change control review process. A Project Manager needs to be proactive in looking for deviations from project plan and then take timely corrective action. After that, the Project Manager needs to evaluate the effectiveness of corrective action, and measure performance of corrective action, and then determine the need for further corrective action.
When a change request is received, the following steps must be taken (in this order) -

1. Evaluate (assess) the impact of change to the project
2. Create alternatives including cutting other tasks, crashing, fast-tracking etc.
3. Meet with management, sponsors, stakeholders etc.
4. Meet with the client, if necessary

Finally, the project must be closed when it has been completed. Closing the project involves reviewing the processes, successes and deficits that were encountered during the project lifecycle. During this phase, lessons learned document is produced by the project management team. The Close Project or Phase is the process of formal completion of all project related activities. The Input, Tools and Techniques and Outputs of this process are given below.

**Close Project or Phase**

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools &amp; Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project management plan</td>
<td>Expert judgment</td>
<td>Final product, service or result transition</td>
</tr>
<tr>
<td>Accepted deliverables</td>
<td></td>
<td>Organisational process assets updates</td>
</tr>
<tr>
<td>Organisational process assets</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

At the end of each phase of a project, a lessons learned document must be prepared. The lessons learned document defines what was done right, wrong etc. It is required to be completed in order for the project to be completed.
9.5. Project Scope Management

The knowledge area of **Scope Management** includes the processes required to ensure that the project includes all the work, and only all the work required to complete the project successfully. It is primarily concerned with controlling what is and what is not in the scope. Elements which need to be included to improve projects planning are defined parameter or scope, and how this must be broken down and managed. The Inputs, Tools and Techniques, and Outputs of Scope Management process are given below.

### Scope Management Processes

<table>
<thead>
<tr>
<th>Process</th>
<th>Project Group</th>
<th>Key Deliverables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan Scope Management</td>
<td>Planning</td>
<td></td>
</tr>
<tr>
<td>Collect Requirements</td>
<td>Planning</td>
<td>Requirements document</td>
</tr>
<tr>
<td>Define Scope</td>
<td>Planning</td>
<td>project scope statement</td>
</tr>
<tr>
<td>Create WBS</td>
<td>Planning</td>
<td>WBS, WBS dictionary</td>
</tr>
<tr>
<td>Validate Scope</td>
<td>Monitoring and Controlling</td>
<td>Acceptance deliverables</td>
</tr>
<tr>
<td>Control Scope</td>
<td>Monitoring and Controlling</td>
<td>Change Requests</td>
</tr>
</tbody>
</table>

Collect Requirements process involves documenting stakeholders needs to meet project objectives. The Inputs, Tools and Techniques, and Outputs of Collect Requirements process are given below.

#### Collect Requirements Process

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools &amp; Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project charter</td>
<td>Interviews</td>
<td>Requirements documentation</td>
</tr>
<tr>
<td>Stakeholder register</td>
<td>Focus groups</td>
<td>Requirements management plan</td>
</tr>
<tr>
<td></td>
<td>Facilitated workshops</td>
<td>Requirements traceability matrix</td>
</tr>
<tr>
<td></td>
<td>Group creativity techniques</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Questionnaires and surveys</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Observations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prototypes</td>
<td></td>
</tr>
</tbody>
</table>
The Define Scope process involves defining detailed description of the project and major deliverables. The Input, Tools and Techniques and Output of the Define Scope process are:

**Define Scope Process**

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools &amp; Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project charter</td>
<td>Expert judgment</td>
<td>Project scope statement</td>
</tr>
<tr>
<td>Requirements documentation</td>
<td>Product analysis</td>
<td>Project document updates</td>
</tr>
<tr>
<td>Organisational process assets</td>
<td>Alternative identification</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Facilitated workshops</td>
<td></td>
</tr>
</tbody>
</table>

### 9.5.1. Develop a Scope Statement

An effective scope statement is necessary to guide a project to successful completion. A scope statement is one of the most critical pieces of a project, and writing one can be a difficult task for a project manager – no matter what type of project management methodology is being used. But, an effectively written scope statement can help the rest of the project flow along with minimal problems.

It is written after the project charter, and includes everything that the project is intended to produce. Now that you have the project charter and the name, you can start by filling in the project name, project charter, and a listing of the project owner, sponsors, and stakeholders on the scope statement.

1. **Justifying Your Existence**: A project justification will need to be identified, as well as project requirements, milestones, and deliverables. Any non-goals - items that fall outside of the scope of the project - need to be identified here.

   Project justification is simply identifying the reason for the project's existence. It is usually a statement or two identifying why the project is being created. It's important to have the project justification identified because this helps to give overall direction to the project as well as emphasising the final goal. The project justification should be clear and precise manner so that it identifies a quantifiable measure of success for the end of the project.

2. **Be sure to include requirements and deliverables**: The next section in the scope statement should list the requirements of the project. The requirements are objectives that must be met during the project, and often they include significant milestones or goals. The objectives need to be quantifiable and identified clearly.

   Any milestones or goals need to be also clearly identified, as well as any non-goals. Non-goals are items that are specifically not going to be addressed by the project, which helps to eliminate the scope creep. By clearly identifying these as non-goals, the scope cannot include them later on without going through a change management process. Ultimately, many project managers track their milestones, goals, and/or deliverables using a Work Breakdown Structure.
The deliverables for a project need to be clearly identified within a scope statement. If necessary, deliverables need to be tied to specific milestones in the project schedule. The deliverables also need to be agreed upon by the major stakeholders as well as the project owner.

Deliverables may include any training necessary for personnel at the culmination of the project. Or deliverables may be a final product to be provided to the stakeholders. No matter what makes up a project's deliverables, specific details regarding them are the golden rule. The more clearly the deliverables are identified and specified, the less chance there will be for scope creep to occur later on.

3. **Include cost estimates for the project**: This is an essential process of project planning, so the cost estimates should be as accurate as possible. If the cost estimates are too low, the project will go over budget - sometimes significantly so. If the cost estimates are too high, resources that are allocated to the project - whether they are money, equipment or people - are unavailable for other projects and could negatively affect them. So the more on track the cost estimates is the more efficient and successful the project will be. This can be a difficult task for the project manager to do, but effective cost management is a critical success factor for projects.

4. **Finalisation and Acceptance**: The last significant section of a scope statement is the formal acceptance signatures. Once the project manager has compiled all of the documentation into a concise and clear statement, all of the major stakeholders as well as the project owner need to sign off on it. This is a very significant step and can be a very useful tool in mitigating scope creep as well. A meeting should be held where everyone can be provided a copy of the scope statement. At that time, any discrepancies can be cleared up or last minute changes can be made.

Once everyone signs off on the scope statement, there should be agreement between all parties and the project can begin. By having everyone sign the scope statement, there is very little chance of surprises down the road. And in the event that something does pop up, there is documentation of what was agreed upon initially so that changes can be made if necessary. If anything does change down the road and the scope does need to be increased for some reason, signatures should be obtained from everyone once more.

Exhaustively detailed specifics, clear and concise language throughout, and avoiding ambiguity are the keys to making a scope statement effective and useful. It is also very beneficial to have all of this information documented in one place - even if the process of creating it is enormous.

The task of creating a scope statement can encompass a great deal of time for any project manager, but the rewards usually include more successful projects and minimised scope creep throughout. And this can be a highly desirable benefit, as scope creep is often a significant cause of project failure. So document as much as possible, as clearly as possible, and make sure everyone involved is aware of what is expected. Through clear and concise documentation, a scope statement's usefulness shines all the way to project success.
Create WBS is the process of dividing the project deliverables into smaller components. The Inputs, Tools and Techniques and Outputs of Create WBS process are:

### Create WBS Process

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools &amp; Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Scope Statement</td>
<td>Decomposition</td>
<td>WBS</td>
</tr>
<tr>
<td>Requirements documentation</td>
<td></td>
<td>WBS dictionary</td>
</tr>
<tr>
<td>Organisational process assets</td>
<td></td>
<td>Scope baseline</td>
</tr>
</tbody>
</table>

**Note: 8/80 rule for WBS** - No task should be less than 8 hours or more than 80 hours. WBS is input to most of the planning processes. Specifically WBS is input to the following processes -

- Cost Estimating
- Cost Budgeting
- Scope control
- Activity Definition
- Plan Purchases and Acquisitions

The Validate Scope is the process in which the project customer formally accepts the project deliverables. Scope Validation happens at the end of each phase. During the Validate Scope process customer gives feedback on work performed. While Validate Scope process focuses on customer acceptance, Perform Quality Control process focuses on correctness of work. The table below gives inputs, Tools & Techniques, and Outputs of the Validate Scope process.

### Validate Scope Process

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools &amp; Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project management plan</td>
<td>Inspection</td>
<td>Accepted Deliverables</td>
</tr>
<tr>
<td>Requirements documentation</td>
<td></td>
<td>Change requests</td>
</tr>
<tr>
<td>Requirements traceability matrix</td>
<td></td>
<td>Project document updates</td>
</tr>
<tr>
<td>Validated deliverables</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Control Scope process involves monitoring the status of project and managing scope changes. The Inputs, Tools and Techniques and Outputs of Control Scope process are:

**Control Scope Process**

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools &amp; Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project management plan</td>
<td>Variance analysis</td>
<td>Work performance measurements</td>
</tr>
<tr>
<td>Requirements documentation</td>
<td></td>
<td>Change requests</td>
</tr>
<tr>
<td>Requirements traceability matrix</td>
<td></td>
<td>Project management plan updates</td>
</tr>
<tr>
<td>Organisational process assets</td>
<td></td>
<td>Organisational process assets updates</td>
</tr>
<tr>
<td>Work performance information</td>
<td></td>
<td>Project document updates</td>
</tr>
</tbody>
</table>
9.6. Project time management

The knowledge area of time management typically refers to the skills, tools, and techniques used to manage time when accomplishing specific tasks, projects, and goals.

To become an effective time manager, you should be able to clearly understand the activities of the project and have the necessary skill set to plan, schedule, and control a project timeline. Along with these skills, you must also be able to utilise time management tools to help you analyse, measure, and assess your time management techniques. Managing time/schedule is about definition, sequencing, resource and duration estimating, schedule development, and schedule control.

The knowledge area of Project Time Management consists of the following processes -

**Time Management Processes**

<table>
<thead>
<tr>
<th>Process</th>
<th>Project Phase</th>
<th>Key Deliverables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan Schedule Management</td>
<td>Planning</td>
<td></td>
</tr>
<tr>
<td>Define Activities</td>
<td>Planning</td>
<td>Activity List, Milestone list</td>
</tr>
<tr>
<td>Sequence Activities</td>
<td>Planning</td>
<td>Project Schedule network diagrams</td>
</tr>
<tr>
<td>Estimate Activity Resources</td>
<td>Planning</td>
<td>Activity resource requirements, Resource breakdown structure</td>
</tr>
<tr>
<td>Estimate Activity Durations</td>
<td>Planning</td>
<td>Activity duration estimates</td>
</tr>
<tr>
<td>Develop Schedule</td>
<td>Planning</td>
<td>Project Schedule</td>
</tr>
<tr>
<td>Control Schedule</td>
<td>Monitoring and Controlling</td>
<td>Work Performance measurements, Change Requests</td>
</tr>
</tbody>
</table>

**Program Evaluation Review Technique (PERT)** and **Gantt charts** are two of the most commonly used project management tools used to schedule, manage and control activities, resources, and timelines on a project, and are described below. Both of these project management tools can be produced manually or with commercially available project management software.

PERT is a planning and control tool used for defining and controlling the tasks necessary to complete a project. PERT charts and Critical Path Method (CPM) charts are often used interchangeably; the only difference is how task times are computed. Both charts display the total project with all scheduled tasks shown in sequence. The displayed tasks show which ones are in parallel, those tasks that can be performed at the same time. A graphic representation called a "Project Network" or "CPM Diagram" is used to portray graphically the interrelationships of the elements of a project and to show the order in which the activities must be performed.
PERT planning involves the following steps:

1. **Identify the specific activities and milestones:** The activities are the tasks of the project. The milestones are the events that mark the beginning and the end of one or more activities.

2. **Determine the proper sequence of activities:** This step may be combined with #1 above since the activity sequence is evident for some tasks. Other tasks may require some analysis to determine the exact order in which they should be performed.

3. **Construct a network diagram:** Using the activity sequence information, a network diagram can be drawn showing the sequence of the successive and parallel activities. Arrowed lines represent the activities and circles or "bubbles" represent milestones.

4. **Estimate the time required for each activity:** Weeks are a commonly used unit of time for activity completion, but any consistent unit of time can be used. A distinguishing feature of PERT is its ability to deal with uncertainty in activity completion times. For each activity, the model usually includes three time estimates:
   - Optimistic time - the shortest time in which the activity can be completed.
   - Most likely time - the completion time having the highest probability.
   - Pessimistic time - the longest time that an activity may take.

   From this, the expected time for each activity can be calculated using the following weighted average:

   \[
   \text{Expected Time} = \frac{\text{Optimistic} + 4 \times \text{Most Likely} + \text{Pessimistic}}{6}
   \]

   This helps to bias time estimates away from the unrealistically short timescales normally assumed.

5. **Determine the critical path:** The critical path is determined by adding the times for the activities in each sequence and determining the longest path in the project. The critical path determines the total calendar time required for the project. The amount of time that a non-critical path activity can be delayed without delaying the project is referred to as slack time.

   If the critical path is not immediately obvious, it may be helpful to determine the following four times for each activity:
   - ES - Earliest Start time
   - EF - Earliest Finish time
   - LS - Latest Start time
   - LF - Latest Finish time

   These times are calculated using the expected time for the relevant activities.

   The earliest start and finish times of each activity are determined by working forward through the network and determining the earliest time at which an activity can start and finish considering its predecessor activities.

   The latest start and finish times are the latest times that an activity can start and finish without delaying the project. LS and LF are found by working backward through the network. The difference
in the latest and earliest finish of each activity is that activity’s slack. The critical path then is the path through the network in which none of the activities has slack.

The variance in the project completion time can be calculated by summing the variances in the completion times of the activities in the critical path. Given this variance, one can calculate the probability that the project will be completed by a certain date assuming a normal probability distribution for the critical path. The normal distribution assumption holds if the number of activities in the path is large enough for the central limit theorem to be applied.

7. **Update the PERT chart as the project progresses**: As the project unfolds, the estimated times can be replaced with actual times. In cases where there are delays, additional resources may be needed to stay on schedule and the PERT chart may be modified to reflect the new situation.

Benefits to using a PERT chart or the Critical Path Method include:

- improved planning and scheduling of activities;
- improved forecasting of resource requirements;
- identification of repetitive planning patterns which can be followed in other projects, thus simplifying the planning process; and
- the ability to see and thus reschedule activities to reflect inter-project dependencies and resource limitations following known priority rules.

It also provides the following: expected project completion time, probability of completion before a specified date, the critical path activities that impact completion time, the activities that have slack time and that can lend resources to critical path activities, and activity start and end dates.

A Gantt chart is a simple and quick way to outline the entire project. Use the Gantt chart to add tasks and their estimated timeframes. Do not worry about dates at this point, but rather focus on the time it will take to complete each individual task.

Gantt charts are used to show calendar time task assignments in days, weeks or months. The tool uses graphic representations to show start, elapsed, and completion times of each task within a project. Gantt charts are ideal for tracking progress. The number of days actually required to complete a task that reaches a milestone can be compared with the planned or estimated number. The actual workdays, from actual start to actual finish, are plotted below the scheduled days. This information helps target potential timeline slippage or failure points.

To draw up a Gantt chart, follow these steps:

1. **List all activities in the plan**: For each task, show the earliest start date, estimated length of time it will take, and whether it is parallel or sequential. If tasks are sequential, show which stages they depend on.

2. **Head up graph paper with the days or weeks through completion**.

3. **Plot tasks onto graph paper**: Show each task starting on the earliest possible date. Draw it as a bar, with the length of the bar being the length of the task. Above the task bars, mark the time taken to complete them.

4. **Schedule activities**: Schedule them in such a way that sequential actions are carried out in the required sequence. Ensure that dependent activities do not start until the activities they
depend on have been completed. Where possible, schedule parallel tasks so that they do not interfere with sequential actions on the critical path. While scheduling, ensure that you make best use of the resources you have available, and do not over-commit resources. Also, allow some slack time in the schedule for holdups, overruns, failures, etc.

5. **Presenting the analysis:** In the final version of your Gantt chart, combine your draft analysis (3 above) with your scheduling and analysis of resources (4 above). This chart will show when you anticipate that jobs should start and finish. An example of a Gantt chart is provided below:

<table>
<thead>
<tr>
<th>Task Name</th>
<th>Feb 8, '98</th>
<th>Feb 15, '98</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Project Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Start of project</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Definition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Analyze requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Conduct Feasibility study</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Preliminary project plan and project proposal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Project plan Complete</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Prepare Functional Specification Document</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Functional specification review</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 Functional Specification Complete</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 Revised Project Plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 Design</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 Prepare Design Specification Document</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 Design Review</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 Revise Documents</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 Setup Development environment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 Design Process complete</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Benefits of using a Gantt chart include:

- Gives an easy to understand visual display of the scheduled time of a task or activity.
- Makes it easy to develop "what if" scenarios.
- Enables better project control by promoting clearer communication.
- Becomes a tool for negotiations.
- Shows the actual progress against the planned schedule.
- Can report results at appropriate levels.
- Allows comparison of multiple projects to determine risk or resource allocation.
- Rewards the project manager with more visibility and control over the project.
The Define Activities process has the following Inputs, Tools and Techniques and Outputs -

**Define Activities Process**

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools and Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope baseline</td>
<td>Decomposition</td>
<td>Activity list</td>
</tr>
<tr>
<td>Enterprise environmental factors</td>
<td>Rolling wave planning</td>
<td>Activity attributes</td>
</tr>
<tr>
<td>Organisational process assets</td>
<td>Templates</td>
<td>Milestone list</td>
</tr>
<tr>
<td></td>
<td>Expert judgment</td>
<td></td>
</tr>
</tbody>
</table>

This step requires you to define the tasks, milestones, and other activities needed to complete the project. Start with a basic definition of each task and fill in the details as the project gets fleshed out.

The Sequence Activities process has the following Inputs, Tools and Techniques and Outputs -

**Sequence Activities Process**

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools and Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project scope statement</td>
<td>Precedence diagram method (PDM) or AON</td>
<td>Project schedule network diagrams</td>
</tr>
<tr>
<td>Activity List</td>
<td>Applying leads and lags</td>
<td>Project document updates</td>
</tr>
<tr>
<td>Activity attributes</td>
<td>Schedule Network Templates</td>
<td></td>
</tr>
<tr>
<td>Milestone list</td>
<td>Dependency determination</td>
<td></td>
</tr>
<tr>
<td>Organisational process assets</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Once the activities have been defined, you can start putting the activities in order. Without worrying about dates, order the activities in a way that makes the most sense to you. Create subtasks as needed and organise the project in a logical manner.

Once you have the activities in order, add dependencies to each task. Using dependencies, rather than dates, will help you see the true timeline of the project. For example, if you are building a website, you will need to design the website before you can start developing it. The design activity is a prerequisite to the development activity. If the design activity is completed later than expected, the development activity will also be pushed out to a later date.
The Estimate Activity Resources process has the following Inputs, Tools and Techniques and Outputs

**Estimate Activity Resources Process**

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools and Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity List</td>
<td>Expert judgment</td>
<td>Activity resource requirements</td>
</tr>
<tr>
<td>Activity attributes</td>
<td>Alternative analysis</td>
<td>Resource breakdown structure</td>
</tr>
<tr>
<td>Resource calendars</td>
<td>Published estimating data</td>
<td>Project document updates</td>
</tr>
<tr>
<td>Enterprise environmental factors</td>
<td>Bottom-up estimating</td>
<td></td>
</tr>
<tr>
<td>Organisational process assets</td>
<td>Project Management software</td>
<td></td>
</tr>
</tbody>
</table>

The Estimate Activity Durations process has the following Inputs, Tools and Techniques and Outputs

**Estimate Activity Durations Process**

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools and Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity list</td>
<td>Expert judgment</td>
<td>Activity duration estimates</td>
</tr>
<tr>
<td>Activity attributes</td>
<td>Analogous estimating</td>
<td>Project document updates</td>
</tr>
<tr>
<td>Activity resource requirements</td>
<td>Parametric estimating</td>
<td></td>
</tr>
<tr>
<td>Resource calendars</td>
<td>Three-point estimates</td>
<td></td>
</tr>
<tr>
<td>Project scope statement</td>
<td>Reserve analysis</td>
<td></td>
</tr>
<tr>
<td>Enterprise environmental factors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organisational process assets</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
This step is one of the more challenging steps because it requires you to assess the supply and demand of each resource/person and how it relates to your specific project. Do you have enough resources to complete the assignment as scheduled or do you need additional resources?

Assign specific people or job roles to each task and then revise the dependencies based on the resource allocation. If a Programmer is required for 15 activities and 10 of them overlap, then you can either hire an additional Programmer or accept that the project timeline will be pushed out further based on the resource dependencies.

The Develop Schedule process has the following Inputs, Tools and Techniques, and Outputs-

**Develop Schedule Process**

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools and Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organisational process assets</td>
<td>Schedule network analysis</td>
<td>Project Schedule</td>
</tr>
<tr>
<td>Project scope statement</td>
<td>Critical path method</td>
<td>Schedule baseline</td>
</tr>
<tr>
<td>Activity List</td>
<td>Schedule Compression</td>
<td>Schedule data</td>
</tr>
<tr>
<td>Activity attributes</td>
<td>What-if scenario analysis</td>
<td>Project document updates</td>
</tr>
<tr>
<td>Project Schedule Network diagram</td>
<td>Resource levelling</td>
<td></td>
</tr>
<tr>
<td>Activity Resource requirements</td>
<td>Critical chain method</td>
<td></td>
</tr>
<tr>
<td>Resource Calendars</td>
<td>Scheduling tool</td>
<td></td>
</tr>
<tr>
<td>Activity duration estimates</td>
<td>Applying calendars</td>
<td></td>
</tr>
<tr>
<td>Project Management Plan - Risk Register</td>
<td>Adjusting Leads and Lags</td>
<td></td>
</tr>
<tr>
<td>Enterprise environmental factors</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The Control Schedule process has the following Inputs, Tools and Techniques and Outputs -

**Control Schedule Process**

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools and Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project management plan</td>
<td>Performance reviews</td>
<td>Work performance measurements</td>
</tr>
<tr>
<td>Project schedule</td>
<td>Variance analysis</td>
<td>Organisational process assets</td>
</tr>
<tr>
<td>Work performance information</td>
<td>Project management software</td>
<td>Change requests</td>
</tr>
<tr>
<td>Organisational process assets</td>
<td>Resource levelling</td>
<td>Project management plan updates</td>
</tr>
<tr>
<td>What-if scenario analysis</td>
<td></td>
<td>Project document updates</td>
</tr>
<tr>
<td>Adjusting leads and lags</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schedule compression</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scheduling tool</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If you used a Gantt chart to create the project timeline, it should be easy to develop a project schedule. Review the Gantt chart with the entire team and make sure you have complete buy-in before you start the project. Everybody should understand their role in the project and should be able to confidently commit to the timeline.

Controlling the schedule is a lot harder than planning the schedule and requires more one-on-one management than you might expect. The project manager should be carefully monitoring the status of the project and verify that the activities are being completed on time and within scope.
9.7. Project cost management

Projects/Contracts require resources, and therefore, there is a need to manage the investment where the benefits derived exceeds the amount spent. Managing costs is about resource planning, cost estimating, budgeting, and control. The knowledge area of Project Cost Management consists of the following processes -

**Project Cost Processes**

<table>
<thead>
<tr>
<th>Process</th>
<th>Project Phase</th>
<th>Key Deliverables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan Cost Management</td>
<td>Planning</td>
<td></td>
</tr>
<tr>
<td>Estimate Costs</td>
<td>Planning</td>
<td>Activity Cost Estimates, Basis of estimates</td>
</tr>
<tr>
<td>Determine Budget</td>
<td>Planning</td>
<td>Cost performance baseline</td>
</tr>
<tr>
<td>Control Costs</td>
<td>Monitoring and Controlling</td>
<td>Work performance measurements</td>
</tr>
</tbody>
</table>

Regardless of scope or schedule, projects need funds to complete the work. Technically, even projects that use only labour have funds attached to them; someone, somewhere is paying for that labour. What happens if you do not have the correct amount of funds to complete the project scope? Your project is doomed. How do we know what a project will cost? We really do not, until the project is complete.

What we can do is create an estimate. An estimate is more than pulling a random number out of the air, adding 20% for good measure. A real estimate evolves as project details become available. This is progressive elaboration. Project estimates start out broad, and as the project deliverables come into focus, we are able to more accurately define our estimates.

Each estimate should provide an acceptable range of variance, the conditions of the estimates, and any assumptions made by the estimate provider.

For example, an estimate to build a new warehouse may state that the warehouse will cost RPS350,000, +/- 10%, is valid for 30 days, and assumes that the warehouse will be built in the month of June.

Notice the range of variance, the assumptions, and the stated work? A good estimate clearly defines what the project will accomplish, the assumptions made, how long the estimate is valid, and how much the project will cost based on current information. A good estimate presents to the stakeholder everything relevant to the proposed work, without holding back any secrets. If there is a disagreement in price, assumptions, or range variance, it is better to discuss this issue now rather than four months into the project execution.
Project managers should rely on three major estimate types:

**The Ballpark Estimate** is also known as the **Rough Order of Magnitude (ROM)**. A ROM estimate is based on high-level objectives, provides a bird's-eye view of the project deliverables, and has lots of range. Most ROM estimates, depending on the industry, have a range of variance from -25% all the way to +75%. ROM estimates, regardless of your role in the project, are simply for a high-level view of the project's initial perceived costs.

**The Budget Estimate (or top-down estimate)** is a bit more accurate. Formulated early in the project's planning stage, the budget estimate is most often based on analogous estimating, taking budget lessons learned from a similar project and applying them to the current project. With the budget estimate, we start at the top and work our way down into the project details. Like the ROM, this estimate should include conditions, a range of variance, and any assumptions that went into your calculations. A budget estimate is quick, but not very accurate. The range of variance on the budget estimate is from -10 percent to +25 percent.

**The Definitive Estimate (or bottom-up estimate)** is the most accurate of the estimate types, but takes the most time to create. The definitive estimate requires a Work Breakdown Structure (WBS) as discussed earlier. A WBS is a deliverables-oriented decomposition of the project scope. A definitive estimate takes lots of time to create, but it is the most accurate estimate you can provide. You may know this as a bottom-up estimate because you start from zero (the bottom) and account for each item the project will purchase, create, or deliver.

The range of variance on a definitive estimate is relatively low: -5% to +10%. This makes sense because it is much easier to predict how much something will cost when you can see everything the project will create. How many projects have you been involved in where you can see everything the project will create from the outset? Probably not too many, or only projects that you have completed repeatedly and therefore know exactly what is expected.

While definitive estimates are ideal for accuracy, they are not easy to create because so much effort has to go into the project before the project manager can create the definitive estimate. This requires education not just for you as project manager, but for your stakeholders, who need to understand that the only way a precise estimate can be created is to invest time in the project itself, by creating the WBS. With any type of estimate, the project manager must provide the range of variance and an explanation of how the estimate was created.

Poor planning is the major cause of poor estimates. Rushed estimates, bloated estimates, or estimates that are "low-balled" just to get the project moving are bound for budget reviews, unpleasant conversations, and project reassessments. Sometimes, thankfully, it is not the project manager's fault when the estimate must change: The cost of materials has changed, the anticipated time to complete the project work was wrong, or the bases for decisions were faulty. In these instances, the project manager still has to communicate the variances.

Poor estimates can also be the fault of the customer, stakeholders, or even the project sponsor. When the stakeholder is responsible, the increase in cost is usually tied to a change request. Contrary to public opinion, change requests are not good things. Ideally, when the customer and the project sponsor sign off on the scope statement, no changes should ever be made to that scope. Of course,
errors and omissions, technological enhancements, and value-added changes all affect the scope's resistance to change.

If the customer demands new deliverables in the project scope, however, a price increase is usually associated with those demands. The monies needed to implement the change have to come from some form of financing. Even changes that replace current scope components may have a price; time and monies may already have been invested in these deliverables.

The second process involved with cost management strategies is cost budgeting. The project manager relies upon the data she has gathered from estimates to set up a realistic project budget, which will be recorded as the project cost baseline. The budget should take into account all stages of the project life cycle.

The third and final process is cost control. All costs need to be monitored against the project baseline, according to work measurements, where there any variances between actuals costs and budgeted costs. The monitoring will also ensure that if the actual cost is deviating too far from the estimated or budgeted cost, that the project manager can effect change to get project spending back on track. Finally, cost control involves informing the relevant stakeholders of the cost discrepancies when the actual cost varies too much from the budgeted cost.
9.8. Project quality management

Projects involve specific deliverables or work products which need to meet project objectives and performance standards. There are three processes for quality management. The first of these three processes is quality planning. Quality planning involves ensuring that the proper project management principles have been applied. These principles include resource management, cost management, and project planning. The knowledge area of Project Quality Management consists of the following processes -

Quality Management Processes

<table>
<thead>
<tr>
<th>Process</th>
<th>Project Phase</th>
<th>Key Deliverables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan Quality Management</td>
<td>Planning</td>
<td>Quality Management Plan, Quality Metrics</td>
</tr>
<tr>
<td>Perform Quality Assurance</td>
<td>Execution</td>
<td>Change Requests</td>
</tr>
<tr>
<td>Perform Quality Control</td>
<td>Monitoring and Controlling</td>
<td>Quality control measurements</td>
</tr>
</tbody>
</table>

Quality management has two goals:

- Ensuring a quality end-product.
- Ensuring that all of the processes involved during the project lifecycle are carried out efficiently.

By managing quality, project managers can ensure a successful project and increased customer satisfaction. Project managers can also increase their bottom line with the boost in productivity.

The process of Plan Quality Management includes defining quality requirements of the project and documenting how the project will ensure compliance. The Inputs, Tools and Techniques and Outputs of the Plan Quality Management process are given below.

Plan Quality Process

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools and Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope baseline</td>
<td>Cost-benefit analysis</td>
<td>Quality management plan</td>
</tr>
<tr>
<td>Stakeholder register</td>
<td>Cost of quality</td>
<td>Quality metrics</td>
</tr>
<tr>
<td>Cost performance baseline</td>
<td>Control charts</td>
<td>Quality checklists</td>
</tr>
<tr>
<td>Schedule baseline</td>
<td>Benchmarking</td>
<td>Process improvement plan</td>
</tr>
</tbody>
</table>
An important aspect of project quality planning involves planning for the quality of the deliverables involved. If the company were working on a new software program, then a quality program would be one that ran properly. One resource in quality planning is quality materials. By having reliable programs, templates, and standards, a project manager can help ensure that the project quality is high.

The second process in quality management is performance of quality assurance tests. These tests use a system of metrics to determine whether the quality plan is proceeding in an acceptable manner. Quality assurance tests both project quality and customer satisfaction with product quality.

Perform Quality Assurance involves reviewing the quality requirements and auditing the results from quality control measurements. Perform Quality Assurance uses data created during Perform Quality Control.

### Perform Quality Assurance

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools and Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project management plan</td>
<td>Plan Quality and Perform Quality Control tools and techniques</td>
<td>Organisational process updates</td>
</tr>
<tr>
<td>Quality metrics</td>
<td>Quality audits</td>
<td>Change requests</td>
</tr>
<tr>
<td>Work performance information</td>
<td>Process analysis</td>
<td>Project management plan updates</td>
</tr>
<tr>
<td>Quality control measurements</td>
<td></td>
<td>Project document updates</td>
</tr>
</tbody>
</table>
Quality Assurance is done during execution of the project. It includes -

- Process of evaluating overall performance on a regular basis
- Re-evaluating quality standards
- Quality audits - structured review of quality activities that identify lessons learned. These lessons learned are used for process improvement.

The final process in quality management involves quality control. Quality control is distinct from quality assurance. Quality control involves operational techniques meant to ensure quality standards. Quality assurance on the other hand has to do with activities that boost confidence surrounding quality.

Perform Quality Control focuses on correctness of work. It includes inspections. The inputs, tools and techniques and outputs (ITTO) used for Perform Quality Control process are -

**Perform Quality Control**

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools and Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project management plan</td>
<td>Cause and effect diagram</td>
<td>Quality control measurements</td>
</tr>
<tr>
<td>Quality metrics</td>
<td>Control charts</td>
<td>Validated changes</td>
</tr>
<tr>
<td>Quality checklists</td>
<td>Flowcharting</td>
<td>Validated deliverables</td>
</tr>
<tr>
<td>Work performance measurements</td>
<td>Histogram</td>
<td>Organisational process assets</td>
</tr>
<tr>
<td>approved change requests</td>
<td>Pareto chart</td>
<td>Change requests</td>
</tr>
<tr>
<td>Deliverables</td>
<td>Run chart</td>
<td>Project management plan updates</td>
</tr>
<tr>
<td>Organisational process assets</td>
<td>Scatter diagram</td>
<td>Project document updates</td>
</tr>
<tr>
<td></td>
<td>Statistical Sampling</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Inspection</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Approved change requests</td>
<td>review</td>
</tr>
</tbody>
</table>

Quality control steps include problem identification, problem analysis and then problem correction. Quality analysis involves more research - it requires data analysis, trend analysis, identification of processes, analysis of processes, and finally the improvement of processes. Quality assurance occurs
before a problem is identified, quality control is reactionary and occurs after a problem has been identified.

### 9.8.1. Developing a quality management plan

The Quality Management Plan defines the acceptable level of quality, which is typically defined by the customer, and describes how the project will ensure this level of quality in its deliverables and work processes. Quality management activities ensure that:

- Products are built to meet agreed-upon standards and requirements
- Work processes are performed efficiently and as documented
- Non-conformances found are identified and appropriate corrective action is taken

Quality Management plans apply to project deliverables and project work processes. Quality control activities monitor and verify that project deliverables meet defined quality standards. Quality assurance activities monitor and verify that the processes used to manage and create the deliverables are followed and are effective.

### Quality Plan Components

The Quality Management Plan describes the following quality management components:

- Quality objectives
- Key project deliverables and processes to be reviewed for satisfactory quality level
- Quality standards
- Quality control and assurance activities
- Quality roles and responsibilities
- Quality tools
- Plan for reporting quality control and assurance problems

### Rationale/Purpose

The purpose of developing a quality plan is to elicit the customer’s expectations in terms of quality and prepare a proactive quality management plan to meet those expectations.

### Who is involved?

Project Manager

Project Team

Customer

Project Sponsor

### Result

Quality Management Plan segment of the Project Plan
The tables below describe actions you perform to create a quality management plan.

### Set Overall Quality Objectives

<table>
<thead>
<tr>
<th>What to do</th>
<th>How to do it</th>
</tr>
</thead>
</table>
| Identify the overall quality objectives for the project | - State the quality objectives in terms of the project objectives and/or organizational objectives.  
- Determine quality objectives for the product with the customer.  
- There may be overall organizational quality objectives or policies that the project can reference. |

### Plan for Quality Project Deliverables – Quality Control

<table>
<thead>
<tr>
<th>What to do</th>
<th>How to do it</th>
</tr>
</thead>
</table>
| 1. Identify the key project deliverables that will be subject to quality review | The key deliverables are the results that need to be delivered fit-for-purpose as identified in the project charter.  
**Example project deliverables:**  
- Project Charter  
- The web application  
- System Design  
- Building blueprint |
| 2. Identify the standards that will be used to evaluate the quality of project deliverables | - Identify the relevant deliverable quality standards, or “measures” used to determine a successful outcome for a deliverable.  
- Ideally your organisation has identified quality standards to be applied. If not, determine what you will use for your project.  
- Example industry quality standards/methods: TQM, Six Sigma, Quality Gates, SPC, Zero Defects, quality circles, continuous improvement, ISO 9000 |
Example quality standards for a project deliverable:

- Project Charter format
- Web Interface Standards
- Documentation Standards

3. Identify the completeness and correctness criteria

Completeness and correctness criteria are defined from the customer’s point of view. Work with the customer to define a “complete and correct” deliverable. The deliverables are evaluated against these criteria before they are formally approved.

Example criteria for Project Charter:

- standard template was used for the project charter
- project deliverables are clearly defined.

Example criteria for a product:

- 95% defect free
- All regulatory requirements are met
- All reports and online displays tie out and balance.

4. Describe the Quality Control activities the project will use to ensure quality standards for project deliverables are met

“Quality Control makes sure the results of what you have done are what you expected. Quality control is product oriented.”

Quality control activities are associated with the creation of project deliverables. Quality control prevents and resolves errors in project deliverables. Quality Control verifies that deliverables are of acceptable quality, they meet the deliverable quality standards, and the completeness and correctness criteria established.

For each deliverable, describe the quality control activities you will execute.

Example quality control activities:

- Quality control check list
- Deliverable review
- Structured walkthroughs
- Statistical sampling
5. Determine how often or when the quality control activity will be performed.

Establish the timeframe or recurring frequency for performing the quality control activity.

**Examples:**
- Deliverable Review – at final delivery
- Structured Walkthrough – at each module completion

---

**Plan for Quality Project Processes - Quality Assurance**

<table>
<thead>
<tr>
<th>What to do</th>
<th>How to do it</th>
</tr>
</thead>
</table>
| 1. Identify the critical project processes that will be subject to quality review | Critical project processes are the activities that must be undertaken correctly and effectively to create the deliverables. **Example project processes:**
  - Change Management Process
  - Communication Process
  - Testing Process
  - Version Release process |
| 2. Identify the relevant process quality standards for evaluating the quality of the project processes | Identify the relevant process quality standards, or “measures” used to determine a successful outcome for a deliverable.
- Ideally your organisation has identified quality standards to be applied. If not, determine what you will use for your project.
- Example industry quality standards/methods: TQM, Six Sigma, Quality Gates, SPC, Zero Defects, quality circles, continuous improvement, ISO 9000
- A written procedure is also a “standard” that defines the steps to execute a process. **Example standards for a project process:**
  - The Project Management Framework
  - Issue resolution completed in five business days |
3. Identify stakeholder expectations for project processes

Work with the project stakeholders to define what it means for a project process to meet their expectations. The project process is then evaluated against these expectations.

**Example stakeholder expectations:**
- Project status will be communicated monthly
- Business subject experts will participate in all requirements-gathering sessions

4. Describe the Quality Assurance activities to be used to ensure the quality standards for project processes are met.

> “Quality Assurance makes sure you are doing the right things, the right way. Quality Assurance is process oriented.”

Quality assurance refers to the internal work processes used to manage and deliver the solution. Quality assurance activities make sure project processes used to manage and deliver the project’s product or service are effective and being applied. Quality assurance can be performed by a manager, customer or third-party reviewer or separate quality assurance group.

**Example quality assurance activities:**
- Quality Assurance Audit
- Quality Assurance Checklist
- Quality Assurance Checkpoints

**Example quality audit questions:**

**For process to create the Project Charter:**
- Has the right sponsor been identified and has the sponsor formally approved the charter?
- Did key stakeholders participate?

**For Project Reporting process:**
- Does each team member produce regular progress reports?

**For Product Transition process:**
- Did the support team receive training on the new
product or service?

5. **Determine how often or when the quality assurance activity will be performed.** Establish the timeframe or recurring frequency for performing the quality assurance activity.

**Example:**
- Quality Assurance Audit – Monthly
- Quality Assurance Check list – at end of each stage

### Identify quality roles, tools and problem-reporting procedures

<table>
<thead>
<tr>
<th>What to do</th>
<th>How to do it</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Identify the quality control and quality assurance roles and responsibilities for the project and actual resources assigned</td>
<td>The quality roles and responsibilities were identified in the project charter, and actual resources were assigned in the staffing plan.</td>
</tr>
<tr>
<td>2. Identify any quality-related tools used to support quality.</td>
<td>Identify the tools you will use and their purposes or uses. <strong>Example</strong></td>
</tr>
<tr>
<td></td>
<td>• Version control tool</td>
</tr>
<tr>
<td>3. Define the quality control and quality assurance problem reporting plan</td>
<td>• Describe the plan to itemize, document and track to closure items reported through the quality control and quality assurance activities.</td>
</tr>
<tr>
<td></td>
<td>• All problems must be tracked to closure and feedback provided to appropriate stakeholders and the project team concerning the status of the problem.</td>
</tr>
</tbody>
</table>
9.9. Project procurement management

Procurement Management is the knowledge area involved in purchasing or acquiring products, services, or results from outside the project team, including developing and administering the contract or purchase order needed to obtain them.

There are four project management processes in the Procurement Management Knowledge Area. The knowledge area of Project Procurement Management consists of the following processes:

**Procurement Management Processes**

<table>
<thead>
<tr>
<th>Process</th>
<th>Project Phase</th>
<th>Key Deliverables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan Procurement Management</td>
<td>Planning</td>
<td>Procurement Management Plan</td>
</tr>
<tr>
<td>Conduct Procurements</td>
<td>Execution</td>
<td>Selected Sellers, Procurement contract award</td>
</tr>
<tr>
<td>Control Procurements</td>
<td>Monitoring and Controlling</td>
<td>Change requests</td>
</tr>
<tr>
<td>Close Procurements</td>
<td>Closure</td>
<td>Closed procurements</td>
</tr>
</tbody>
</table>

The first process, Plan Procurement Management, creates the Procurement Management Plan which is the framework for all of the other processes.

The Plan Procurement process involves build versus buy decisions. The Inputs, Tools and Techniques, and Outputs of Plan Procurement process are listed in the table below.

**Plan Procurement Management process**

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools and Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope baseline</td>
<td>Make-or-buy analysis</td>
<td>Procurement management plan</td>
</tr>
<tr>
<td>Requirements documentation</td>
<td>Expert judgment</td>
<td>Procurement statements of work</td>
</tr>
<tr>
<td>Teaming agreements</td>
<td>Contract types</td>
<td>Make-or-buy decisions</td>
</tr>
<tr>
<td>Risk register</td>
<td></td>
<td>Procurement documents</td>
</tr>
<tr>
<td>Risk-related contract decisions</td>
<td></td>
<td>Source selection criteria</td>
</tr>
</tbody>
</table>
The second process, Conduct Procurements, is where the bidding process for a contract is conducted. The responses or bids of the sellers are evaluated according to criteria set up in the Procurements Management Plan, and the seller is selected and the contracted awarded.

**Conduct Procurement process**

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools and Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Management Plan</td>
<td>Bidder conferences</td>
<td>Selected sellers</td>
</tr>
<tr>
<td>Procurement documents</td>
<td>Proposal evaluation techniques</td>
<td>Procurement contract award</td>
</tr>
<tr>
<td>Source Selection criteria</td>
<td>Independent estimates</td>
<td>Resource calendars</td>
</tr>
<tr>
<td>Qualified seller list</td>
<td>Expert judgment</td>
<td>Change requests</td>
</tr>
<tr>
<td>Seller proposals</td>
<td>Advertising</td>
<td>Project management plan updates</td>
</tr>
<tr>
<td>Project documents</td>
<td>Internet search</td>
<td>Project document updates</td>
</tr>
<tr>
<td>Make-or-buy decisions</td>
<td>Procurement negotiations</td>
<td></td>
</tr>
<tr>
<td>Teaming agreements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organisational process assets</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
During the course of the project, the Control Procurements process manages the relationship, evaluates the performance of the seller on the contract, and any changes or corrections that are required to be implemented by the seller are monitored.

The process of Control Procurement involves managing procurement relationships and ensuring the seller performance meets the procurement requirements.

**Control Procurement process**

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools and Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procurement documents</td>
<td>Contract change control system</td>
<td>Procurement documentation</td>
</tr>
<tr>
<td>Project management plan</td>
<td>Procurement performance reviews</td>
<td>Organisational assets updates</td>
</tr>
<tr>
<td>Contract</td>
<td>Inspection and audits</td>
<td>Change requests</td>
</tr>
<tr>
<td>Performance reports</td>
<td>Performance reporting</td>
<td>Project management plan updates</td>
</tr>
<tr>
<td>Approved change requests</td>
<td>Payment systems</td>
<td></td>
</tr>
<tr>
<td>Work performance information</td>
<td>Claims administration</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Records management system</td>
<td></td>
</tr>
</tbody>
</table>

The process of Close Procurement involves completing each procurement. The process involves verifying that all planned work as per the contract has been completed. The Close Procurements process is where the deliverable from the seller is accepted and the project procurements are formally closed.

**Close Procurement process**

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools and Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project management plan</td>
<td>Procurement audits</td>
<td>Closed procurements</td>
</tr>
<tr>
<td>Procurement documentation</td>
<td>Negotiated settlements</td>
<td>Organisational process updates</td>
</tr>
<tr>
<td></td>
<td>Records management system</td>
<td></td>
</tr>
</tbody>
</table>
### 9.9.1. Procurement Management Planning

Procurement Management Planning has elements that touch upon practically all of the other knowledge areas. The following is a list of elements of the Procurement Management Plan, arranged by related knowledge area in order to put some structure to this rather large list of elements.

<table>
<thead>
<tr>
<th>Related Knowledge Area</th>
<th>Plan Element</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Integration</td>
<td>Project constraints and assumptions that could affect planned procurements</td>
</tr>
<tr>
<td>2. Scope</td>
<td>Direction to sellers on developing and maintaining work breakdown structure (WBS)</td>
</tr>
<tr>
<td>3.</td>
<td>Format for procurement statement of work (SOW) to be put in contract</td>
</tr>
<tr>
<td>4. Time</td>
<td>Coordination of procurement with project scheduling</td>
</tr>
<tr>
<td>5.</td>
<td>Handling long lead times to purchase certain items from sellers and coordinating extra time needed with project schedule</td>
</tr>
<tr>
<td>6.</td>
<td>Linking make-or-buy decision with Estimate Activity Resources and Develop Schedule processes</td>
</tr>
<tr>
<td>7.</td>
<td>Setting scheduled dates for delivery and acceptance of contract deliverables</td>
</tr>
<tr>
<td>8. Cost</td>
<td>Whether independent estimates will be used as evaluation criteria</td>
</tr>
<tr>
<td>9. Quality</td>
<td>Performance criteria for acceptance of deliverables</td>
</tr>
<tr>
<td>10. Human Resources</td>
<td>Roles and responsibilities for project management team coordination with the organization’s procurement or purchasing department</td>
</tr>
<tr>
<td>11. Communications</td>
<td>Coordination of procurement with performance reporting</td>
</tr>
<tr>
<td>12. Risk</td>
<td>Risk management issues related to procurement</td>
</tr>
<tr>
<td>13.</td>
<td>Requirements for performance bonds or insurance contracts to mitigate project risk</td>
</tr>
<tr>
<td>14. Procurements</td>
<td>Types of contracts to be used (fixed price, cost-reimbursable, or time &amp; material)</td>
</tr>
<tr>
<td>15.</td>
<td>Identifying pre-qualified sellers</td>
</tr>
<tr>
<td>16.</td>
<td>Procurement metrics to be used in evaluating sellers and managing contracts</td>
</tr>
<tr>
<td>17.</td>
<td>Management of multiple suppliers</td>
</tr>
<tr>
<td>18. Stakeholder</td>
<td>Include sellers as one of stakeholder groups to be managed</td>
</tr>
<tr>
<td>19. EEFs</td>
<td>Industry or professional organization information resources regarding potential sellers</td>
</tr>
<tr>
<td>20. OPAs</td>
<td>Standardized procurement documents</td>
</tr>
</tbody>
</table>

In most functional organisations, very few people can place orders for equipment or services and those few people tend to have a number of checks and processes designed to ensure that they are doing the right thing. The project's stakeholders are also likely to want to know who is making the decision on prime items of equipment and how that person will be making those decisions.
When conducting procurement a project manager is exposed to a number of potential sellers all of whom want the project manager's business. Conducting procurements involves releasing procurement documents to the market, collecting proposals, analysing those proposals, evaluating them and selecting the preferred seller.

Having selected a seller and negotiated a contract, the project manager needs to administer the contract, i.e. track progress, and ensure that what was requested is in fact delivered and that payments are made as appropriate. Often this is left to other parts of the organisation to manage; however, it is the project and, thereby the project manager, who experiences any contract mismanagement impacts. As such, the project manager needs to be fully aware of contract progress.

During the bidding process, project managers will need to draw support and guidance from a range of subject matter experts. A project manager will generally need guidance with the following:

- procurement process
- contract
- technical content

Many project procurements are simple product purchases where the seller sets the conditions and the buyer (the project) agrees, purchases the item and pays the bill.

Documentation is likely to consist of a purchase order, receipt of goods, invoice and statement. Fundamentally, this is not much more complex than buying groceries. However, a reasonable portion of project procurement involves buying complex goods and services that require the construction of a purchase-specific contract by a lawyer or procurement expert.

Simplistically, a contract is a commercial agreement, of legal standing, between two parties identifying what each will do for or expects from the other.

Broadly, there are three types of contracts, with many variations based upon this dichotomy. The difference lies in the level of commercial risk borne by each party and the type of work management undertaken by each of the parties. The basic contract types are:

- fixed price (sometimes referred to as firm fixed price) - the buyer pays the seller a set amount regardless of the seller's costs; the seller bears the risk of any cost overruns
- cost reimbursement - the buyer pays to the seller the seller's actual costs, plus a fee typically representing the seller's profit; the buyer bears the risk of any cost overruns
- time and material (T&M) - strictly speaking a cost-reimbursement contract. T&M contracts are treated as a special case of cost plus usually used for activities such as professional services.

While cost plus contracts are common for labour hire, including professionals (doctors, dentists, contractor and consultants) - the goals of the seller and the goals of the buyer are not aligned. The buyer wants to keep their costs (the price) down, but the seller wants to increase the overall price to increase their profit. Therefore, cost plus contracts involves a need for the buyer to control the work being done by the seller. This is relatively easy when one or two people are involved, but virtually impossible when tens or even hundreds are people are involved across multiple sites.

The types of cost plus contracts are:

- Cost plus fee (CPF) or cost plus percentage fee (CPPF)
- Cost plus fixed fee (CPFF)
- Cost plus incentive fee (CPIF)
- Cost plus award fee (CPAF)

Time and material contracts (T&M contracts) are similar to cost plus contracts in that they reimburse for cost and effort, although T&M contracts often have a fixed contract element within them.

Further issues the project manager needs to consider regarding procurement planning are as follows:

**Expert guidance**

The project manager will need to seek expert guidance to determining the best method to engage with the market to ensure that a wide range of sellers is aware of the project's procurement need.

**Independent estimates**

This is another form of expert judgment. When you receive the responses to your RFT or RFP, how do you know if the prices are reasonable? How do you avoid paying too much? One tool to help with this is the independent estimate.

**Advertising**

One of the key success factors to procurement is ensuring that the market knows that the project is actually seeking some form of goods and/or services.

**Bidder’s conference**

The buyer provides this briefing to the potential sellers. The briefing generally gives an overview of the statements of work and how bids will be evaluated and offers bidders the opportunity to ask questions.

**Proposal evaluation techniques**

Evaluation of complex responses will require evaluation by a team of different subject matter experts. This often results in a wide range of opinions between the subject matter experts as to which is the best proposal.

**Procurement negotiation**

Negotiation occurs after the best submission or proposal has been selected. Negotiation involves the buyer and seller meeting to discuss and resolve any differences in understanding the statement of work. The objective of the negotiation is to end up with a contract that both organisations can execute so the work can be delivered to the project.

**Selected sellers**

This involves preparing an evaluation report for senior management approval. This explains why a particular seller has been selected to provide products to the project.

**Records management**

Within project procurement, a records management system (a subset of the project management information system—PMIS) must be developed to keep track of:
During the control procurement phase, the following needs to be considered:

**Performance assurance**

Often some form of action is taken, especially on larger projects, to ensure that what the seller represents in their performance reports is what actually has happened. This is not an expression of distrust of the seller, but just prudent management to ensure the broader project does not receive unpleasant surprises.

Tools that can be used for performance assurance are:

- procurement performance review—formal review of progress against schedule, cost and scope baselines involving both seller and buyer personnel who know about the project checking that work has been done correctly
- inspections/audits—a more formal review that checks compliance of performance against requirement specifications. This is sometimes undertaken by a third party acting on behalf of the buyer.

At the closing procurement stage, the following must be considered:

**Procurement audit**

At the end of a contract the seller will obviously seek final payment to close the contract. This is often initiated in the form of a completion certificate

**Negotiated settlement**

Unfortunately, at times, no agreement can be reached about how to resolve any remaining procurement issues. Options then available to the project manager are:

- Escalation to the buyer's and seller's management teams to negotiate resolution of the issue.
- Seek a resolution through a formal mediation or arbitration process whereby the seller and buyer agree to whatever outcome the mediator deems fair.
- As a last resort, legal action through the court system.

**Organisational process assets updates**

The organisational process assets are to be updated to reflect the completion of the procurement, i.e. archiving copies of the contract, contract changes, completion certificate, copies of all correspondence, payment records, seller performance assessment and any lessons learned.

**Close procurements**
Close procurements is the formal end of the contract. This is where the project accepts that it has received all the goods and services requested under the contract, in a fit-for-purpose condition and then pay the seller any remaining monies owed.

Outputs of the planning process include the following:

A **Project Procurement Plan** which identifies:

- what products or services need to be procured
- how the project will decide which products or services do need to be procured
- the process for advising the market of the procurement
- the process for selection of the candidate seller
- the process for approving the purchase decision.

**Procurement statement of work**

The Procurement Statement of Work (or Procurement SOW) is a critical component of the procurement process. It can be considered the “seed” of the procurement, and it provides suppliers with a clearly stated set of goals, requirements, and outcomes from which they can provide a quantifiable response. The procurement statement of work may include the following elements:

- Specifications
- Quantity desired
- Quality level
- Performance data
- Period of performance
- Work location

**Procurement documents**

There are different documents which are used to formally request procurements, among which are the following types:

- Request for Information (RFI)
- Invitation for Bid (IFB)
- Request for Proposal (RFP)
- Request for Quotation (RFQ)
- Tender Notice
- Invitation for Negotiation
- Invitation for Seller’s Initial Response

Specific procurement terminology used may vary by industry and location of the procurement.
Source selection criteria

Selection criteria may be as narrow as simply the purchase price and the cost of delivery if the procurement item is “off-the-shelf”, or readily available from a number of acceptable sellers. For more complex products, the following may be used as source selection criteria:

- Understanding of need (does the seller’s proposal address the Procurement SOW?)
- Overall or life-cycle cost (including purchase cost and operating cost)
- Technical capability (does the seller have the technical skills and knowledge required?)
- Risk (how much risk is embedded in the SOW?; how much risk will be assigned to the seller?; how does the seller mitigate risk?)
- Management approach (does the seller have management processes and procedures to ensure a successful project?)
- Technical approach (does the seller’s technical methodologies meet the procurement document requirements?)
- Warranty (what does the seller propose to warrant in the final product, and for what period?)
- Financial capacity (does the seller have the necessary financial resources?)
- Production capacity and interest (does the seller have the capacity and interest to meet potential future requirements for production?)
- Business type and size (does the seller’s enterprise meet a specific category of business set forth as a condition of the agreement award such as a small business?)
- Past performance of sellers (what has been the past experience with selected sellers?)
- References (can the seller provide references from prior customers?)
- Intellectual property rights (does the sellers assert IP rights in the work processes or services they will use or in the products they produce for the project?)
- Proprietary rights (does the sellers assert proprietary rights in the work processes or services they will use or in the products they produce for the project?)

Change requests

When the contract is awarded, there may or may not be a need to update a range of plans to reflect any variation to cost, schedule or scope that resulted from the contract's negotiation. This should be fed through the project's change management system to ensure that all impacts are fully assessed and all parties are aware of these changes.
9.10. Project human resource management

Projects often rely on more than one resource. They are made up teams which need to be managed during the life cycle of the project. Managing human resources is about human resources planning, hiring, and developing and managing a project team. This applies to internal project as well as management of external contractors. The knowledge area of Project Human Resource Management consists of the following processes -

**Human Resource Management Processes**

<table>
<thead>
<tr>
<th>Process</th>
<th>Project Phase</th>
<th>Key Deliverables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquire Project Team</td>
<td>Execution</td>
<td>Project Staff assignments</td>
</tr>
<tr>
<td>Develop Project Team</td>
<td>Execution</td>
<td>Team performance assessments</td>
</tr>
<tr>
<td>Manage Project Team</td>
<td>Execution</td>
<td>Change requests</td>
</tr>
</tbody>
</table>

Plan Human Resource Management process involves identifying and documenting project roles and responsibilities. The table below gives the inputs, tools and techniques, and Outputs for the Plan Human Resource Management process -

**Plan Human Resource Management Process**

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools and Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enterprise environmental factors</td>
<td>Organisation charts and position descriptions</td>
<td>Human resource plan</td>
</tr>
<tr>
<td>Organisational process assets</td>
<td>Organisational Theory</td>
<td></td>
</tr>
<tr>
<td>Activity resource requirements</td>
<td>Networking</td>
<td></td>
</tr>
</tbody>
</table>

The plan human resource management process involves identifying and documenting project roles, responsibilities, required skills and relationships in order to create a staffing management plan. As seen from the definition, the output of this process is a project human resource management plan.

The major inputs of the plan human resource management process are the project management plan and the activity resource requirements. The project management plan shows the project baselines (scope, time and cost), change requirement plans, and how they integrate to meet the project objectives. The activity resource requirements (that have been defined in the project time project) show the human resource needs of the project. Other inputs of the plan human resource management process include the enterprise environmental factors and organization process assets.
The tools and techniques of the plan human resource management process include:

Organizational charts and position description: These are used to document team member roles and responsibilities. There are three kinds:

**Hierarchical Organizational Charts:** These are charts that are used to show positions and relationships in a top-down, graphical manner. These charts are similar to the Work breakdown structure created in the project scope management. An example is the Organizational Breakdown Structure (OBS). The OBS shows the departmental breakdown of an organization and the project activities that are assigned to each department. Another example of this kind of chart is the Resource Breakdown Structure (RBS). This shows the resource breakdown for each project activity in a manner similar to the WBS. The RBS can contain other resources that are not human resources.

**Matrix Charts:** Also called Responsibility Assigned Matrix (RAM). This is used to show the relationship between assigned tasks and resources. It is particularly useful for tasks that have various levels of detail assigned to different people. An example of a RAM is a RACI matrix. RACI stands for (Responsible, Accountable, Consult and Inform). An example of a RACI chart is shown below:

![RACI Chart](image)

The output of this process is the project human resource management plan. The plan contains project roles and responsibilities, organizational charts and the staffing management plan.

Acquire project team process involves identifying and obtaining the team necessary to execute the project. The table below gives the inputs, tools and techniques, and Outputs for the Acquire project team process -

**Acquire project team process**

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools and Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project management plan</td>
<td>Pre-assignment</td>
<td>Project staff assignments</td>
</tr>
<tr>
<td>Enterprise environmental factors</td>
<td>Negotiation</td>
<td>Resource calendars</td>
</tr>
<tr>
<td>Organisational process assets</td>
<td>Acquisition</td>
<td>Project management plan updates</td>
</tr>
<tr>
<td></td>
<td>Virtual teams</td>
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</tr>
</tbody>
</table>
The acquire project team process involves confirming the availability of human resources required for a project and obtaining the team necessary to perform the project activities. As a project manager, your goal is to work with cross-functional team leaders to acquire the human resources. Sometimes the human resources needed for a project need to be sourced outside the organisation. In this case, the project manager needs to work with the procurement team in order to source the personnel required.

The major input of the Acquire Project Team process is the human resource management plan which contains the project roles and responsibilities, organizational charts and the staffing management plan.

The tools and techniques for the Acquire Project Team process include:

1. Pre-assignment: This is the selection of project team members in advance. This is usually a result of a competitive proposal, or if the project requires the specific expertise of some people. Usually pre-assigned project team members are defined in the project charter.

2. Negotiation: Usually, a project manager needs to negotiate for the project team with:
   - Functional managers (e.g. departmental heads)
   - Other project management teams
   - External sources (suppliers, vendors, etc.)

A project manager’s ability to negotiate is critical to the success of the project team acquisition because the best human resources are usually scarce and functional managers might need to choose among different project teams.

3. Acquisition: This involves sourcing for project team members outside the organization. Acquisition can be done by hiring consultants or sub-contracting to another organization.

4. Virtual teams: These teams have little or no face-to-face interaction. As a project manager, you should pay attention to communication issues among virtual team members. We will discuss project communication management in detail in another article.

5. Multi-criteria decision analysis: This involves using multiple criteria in team selection. Possible team members are rated and scored on several criteria. Some of the criteria can include availability, competency, cost, experience, skills, etc.

The major outputs of the acquire project team process are the project staff assignments and the resource calendars. A resource calendar shows the time when a project team member can carry out an activity.

**Develop project team process**

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools and Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project staff assignment</td>
<td>Interpersonal skills</td>
<td>Team performance assessments</td>
</tr>
<tr>
<td>Project management plan</td>
<td>Training</td>
<td>Enterprise environmental factors updates</td>
</tr>
<tr>
<td>Resource calendars</td>
<td>Team-building activities</td>
<td></td>
</tr>
</tbody>
</table>
### Ground rules

<table>
<thead>
<tr>
<th>Ground rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-location</td>
</tr>
<tr>
<td>Recognition and rewards</td>
</tr>
</tbody>
</table>

This is the process of improving team member competencies, interaction among team members and the working environment in order to improve the performance of the team members on the project. The outputs of the two processes discussed above (project human resource management plan, staff assignments and resource calendars) serve as inputs to the develop project team process.

The tools and techniques for the develop project team include:

1. **Interpersonal skills:** Also known as “soft-skills”, interpersonal skills include communication skills, conflict resolution skills, negotiation, influence, team building, etc.

2. **Training:** As a project manager, you might need to include a training budget for a project and future projects. Trainings can be classroom based, online, on-the-job training, etc. It is also advisable to pair-up an inexperienced project team member with someone more experienced so that the more experienced team member can provide guidance and mentorship.

3. **Team building activities:** Teams usually go through team development stages. The popular model for team development is the Tuckman (1965) model. The stages are:
   - **Forming:** Team meets and learns about individual responsibilities. The team is usually independent at this stage.
   - **Storming:** Team starts trying to work together. Many conflicts arise in this phase.
   - **Norming:** Team begins to find a rhythm to work together. Team members begin to place team interests above individual interests and learn to trust each other.
   - **Performing:** Team becomes interdependent and work effectively.
   - **Adjourning:** Team completes the work and moves on from the project. This is usually a part of the close project process (which would be discussed in more detail when we explore project integration management).

4. **Ground rules:** This is useful to ensure that the team has an understanding of the expectations required from them.

5. **Colocation:** This is also called tight matrix. It involves bringing the project team together in a specific location (called a “war room”) in order to increase enhance communication and a sense of belonging.

Other tools and techniques of the develop project team process include rewards, recognition and personnel assessment tools.

The major output of the develop project team is the team performance assessments.
Manage project team process is the process of tracking team member performance and managing issues within the team. The table below gives the inputs, tools and techniques, and Outputs for the Manage project team process -

**Manage project team process**

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools and Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project staff assignments</td>
<td>Observation and conversation</td>
<td>Enterprise environmental factors updates</td>
</tr>
<tr>
<td>Project management plan</td>
<td>Project performance appraisals</td>
<td>Organisational process assets updates</td>
</tr>
<tr>
<td>Team performance assets</td>
<td>Conflict management</td>
<td>Change requests</td>
</tr>
<tr>
<td>Performance reports</td>
<td>Issue log</td>
<td>Project management plan updates</td>
</tr>
<tr>
<td>Organisational process assets</td>
<td>Interpersonal skills</td>
<td></td>
</tr>
</tbody>
</table>

The inputs to this process include the human resource plan, staff assignments, team performance assessments, issue logs and work performance reports.

The tools and techniques for the manage project team process include:

1. Observation and conversation: This is the easiest way to keep abreast of what is going on with the team members.

2. Project performance appraisals: This can be formal or informal. They are used to clarify issues and provide feedback to the team members. Performance appraisals are also used as a reference point for future training needs and targets for team members.

3. Conflict resolution: This is one of the most important skills a project manager should possess. There are various conflict resolution approaches. Some of them include:
   - Withdrawal or Avoidance: This involves postponing the issue so that it can be resolved later or by someone else.
   - Smoothing or Accommodation: This involves emphasizing areas of agreement more than areas of disagreement in a conflict situation. This usually results in a temporary feeling of resolution among the parties involved.
   - Compromise or Reconciliation: This involves settling for a solution that brings a degree of satisfaction to all the parties involved.
   - Forcing or Directing: This is a win-lose situation in which one party’s solution is forced over the other party’s viewpoint. This is usually enforced from a position of power or in an emergency.
• Collaborate or Problem Solving: This involves integrating multiple viewpoints in order to reach a common consensus.

The kind of conflict resolution chosen by a project manager depends on the unique attributes of the project and the nature of the conflict.

Interpersonal skills: In managing the project team, a project manager must cultivate interpersonal skills such as leadership, influencing and effective decision making.

The major output of the manage project team process are change requests (usually staffing changes). Other outputs include updates to the project management plan and project documents. In some cases, there might be updates to the organizational process and the enterprise environmental factors.
9.11. Project communication management

Projects can include project participants, managers who oversee the project and external stakeholders who have an interest in the success of the project. Managing communication is about communications planning, information distribution, performance reporting, and stakeholder management.

The knowledge area of Project Communications Management consists of the following processes -

**Communications Management Processes**

<table>
<thead>
<tr>
<th>Process</th>
<th>Process Group</th>
<th>Key Deliverables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan Communications Management</td>
<td>Planning</td>
<td>Communication Management Plan</td>
</tr>
<tr>
<td>Manage Communications</td>
<td>Executing</td>
<td>Organisation assets updates</td>
</tr>
<tr>
<td>Control Communication</td>
<td>Monitoring and Controlling</td>
<td>Performance Reports</td>
</tr>
</tbody>
</table>

The Inputs, Tools and Techniques, and Output of Plan Communications process is given below.

**Plan Communications Process**

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools &amp; Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stakeholder register</td>
<td>Communication requirements</td>
<td>Communications management plan</td>
</tr>
<tr>
<td>Stakeholder strategy</td>
<td>analysis</td>
<td></td>
</tr>
<tr>
<td>Enterprise factors</td>
<td>Communication technology</td>
<td>Project document updates</td>
</tr>
<tr>
<td>Organisational process assets</td>
<td>Communication models</td>
<td></td>
</tr>
</tbody>
</table>

Throughout the project duration, information is shared with stakeholders as planned. This sharing of information is part of the Manage Communications process. The Inputs, Tools and Techniques, and Output of Manage Communications process is given below.

**Manage Communications**

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools &amp; Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
</table>
The Control Communications process involves sharing the project status reports and measurements with appropriate stakeholders.

**Control Communications Process**

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools &amp; Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Management Plan</td>
<td>Variance analysis</td>
<td>Performance reports</td>
</tr>
<tr>
<td>Work performance information</td>
<td>Forecasting methods</td>
<td>Organisational process assets updates</td>
</tr>
<tr>
<td>Work performance measurements</td>
<td>Communication methods</td>
<td>Change requests</td>
</tr>
<tr>
<td>Budget forecasts</td>
<td>Reporting systems</td>
<td></td>
</tr>
<tr>
<td>Organisational process assets</td>
<td></td>
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</tr>
</tbody>
</table>

Plan Communications Management defines how and when the various stakeholders receive information, and communicate with each other. Plan Communications process involves determining what kind of information should be shared with which project stakeholder. This is documented in the Communication management plan. Also documented is how and when the communication needs to be shared with stakeholders.

Communication is one key element which has to be applied effectively throughout a project’s life cycle from the beginning till the end. Hence, why is it that Project Managers are not communicating effective? The challenges a Project Manager has may include the following:

**Stakeholders**

A modest project will tend to have a number of people who need to know its progress and about any issues which crops up during execution. Modern projects nowadays often have an added complication of stakeholders scattered all over the globe. Without a solid communication plan and strategy, it will be impossible to keep everyone up to date and informed.

In addition to that, different stakeholders may have different expectations and hence the method of communication may vary from one to another and hence a standard communication plan may not be effective.
Team members

A project team is generally quite a diverse group of people. Project teams are usually thrust together to deliver a customized and unique benefit to an organisation. In some projects, team members are put together and have never worked together before. The diversity within a project team which can be cultural, geographical, organisational, functional, age related, level of education and so on is indeed the biggest challenge for a project manager.

Ever changing situation

All projects are by nature fluid and ever changing. Hence a project manager has to consider the changes and challenges all the way until the end of the project and ensure that the team and stakeholders are fully up to date with issues and progress so that there will be no nasty surprises for them to discover later on.

Hence, to ensure that effective communication is applied throughout the whole project and to overcome the challenges, a Project Manager should incorporate a communication plan at the planning stage of the project.

Efficient communication means providing only the information that is needed’ Hence, the project manager has to tailor the communication plan accordingly for each project. The plan should be maintained and updated throughout the project life cycle if there are any changes.

A communication plan facilitates effective and efficient communications with the various audiences having a major stake in the project. It describes how project communications will occur. A good communication plan generally includes the following elements:

- Communication objectives
- Target audiences
- Key content for the communications
- Communication method and frequency
- Rationale/Purpose

Good two-way communications among all stakeholders is key for the success of the project. Good communication forestalls surprises, prevents duplication of effort, and can help to reveal omissions and misallocation of resources early enough to permit corrections.

Who is Involved?

Project Manager

Project Sponsor

Project Stakeholders

Result

This information is included in a separate section of your project plan often referred to as the “Communication Plan.”
### 9.11.1. Develop Project Communication Plan

The table below lists the steps for developing a project communication plan:

<table>
<thead>
<tr>
<th>Focus on the following</th>
<th>Questions to ask</th>
</tr>
</thead>
</table>
| 1. Communication objectives | • What are you hoping to achieve with your project communications?  
• Look at the objectives established for the project. |
| 2. Target audiences (internal and external) and the makeup of each audience | • Whom do you want to communicate with?  
• Refer to the roles established for the project. Consider a broad range of stakeholders. |
| 3. Purpose of the communication for each audience | • Why are you communicating with them?  
• Think about what your audience would like to know from their perspective - “What’s in it for me?” |
| 4. Key communication messages and the content of the message | • What do you want to say?  
• The content should address the reason the audience will be interested in the project. |
| 5. Information sources | • Where will you find the information you need to collect for your communications?  
• Some information may be from official sources, and other information will be created as part of the project and stored in the project repository. |
| 6. Frequency of the communication | • How often do you want the communication to be delivered?  
• Weekly, bi-weekly, monthly, at the end of a stage, etc. |
| 7. Format and delivery mechanism for the communication | • How does the target audience prefer to receive this information?  
• Report, phone, website, meeting, formal presentation, etc. |
| 8. The messenger | • Who is the responsible communicator?  
• Who prepares and distributes or presents the communication?  
• Usually the project manager and project sponsor are the main communicators, but the size of the project may require the assignment of a role of project communicator. |
9. Communication milestones and measurements of success

- How will you know if your plan is working?
- Establish some simple performance indicators and evaluation measures to determine if the communication plan is effective. Example – use of a Meeting Evaluation form after a meeting.

There are numerous other tools that a project manager can use to better tailor a communication approach. For example, for stakeholder analysis, a Power/Interest grid could be used where stakeholders are grouped based on their level of authority (‘power’) and their level of concern (‘interest’) regarding the project’s outcome. Once the analysis is obtained, a project manager can now assess how key stakeholders are likely to react or respond in various situations, in order to plan how to influence them to enhance their support and mitigate potential negative impacts.

![Power/Interest Grid](image)

Power/Interest Grid

Another tool project managers can use to improve communication in regards to problems on the project is by creating a fish bone diagram or Ishikawa Diagram. Each bone is labelled with a problem and then it is broken down further by looking at the causes for each problem. This tool is simple but effective at getting to the real issue quickly.
Using a RACI chart, as mentioned under Project Human resource management in chapter 9.10, can be very helpful too in promoting healthy communication in a team. RACI stands for Responsible, Accountable, Consulted and Informed. The chart ensures that at least one person is in charge of each category, as well as helps others to see their role in assisting the responsible person in getting the job done. This also helps prevent communication that does not need to take place and only interrupts the flow.

In conclusion, effective communication is indeed important for a successful project and in order to achieve effective communication in a project, communication planning is essential and using tools and putting processes in place to ensure daily effective communication during project execution will overcome the challenges and contribute to a more successful project.
9.11.2. Methods of Communication

Given the geographical and organisational diversity within typical project teams today, successful project managers should also consider how the team could best communicate, and to put in place tools to facilitate efficient and frequent communication. Unlike 20 years ago, there is a wealth of technology-based tools available to facilitate efficient communication, wherever individuals may be.

A communication strategy should be conceived at the project planning stages, so key is its influence on the success of the project. You could consider communication methods which are either active or passive.

**Active communication** methods being those used to communicate in the here and now, for example the use of:

- Face to Face meetings
- Video conference, meeting - one on one, or group
- Telephone conference, or voice only web conference
- Webinars, becoming increasingly popular for the delivery of presentation based activities
- Telephone
- Stand Up presentations in person

**Passive communication** methods would be those which recipients can adopt in their own time, for example:

- Pod cast
- Web cast
- Email
- Intranet bulletin boards
- Blogs
- Website
- Project Newsletter - paper based
- Table top presentation
9.12. Project risk management

Projects encounter a variety of risks. Projects may also encounter unexpected events, such as project team members resigning, budgeted resources suddenly changing and newer technologies being introduced. These risks need to be properly identified and managed. Managing risk is about risk planning and identification, risk analysis (qualitative and quantitative), risk response (action) planning, and risk monitoring and control.

The knowledge area of Project Risk Management consists of the following processes:

**Risk Management Processes**

<table>
<thead>
<tr>
<th>Process</th>
<th>Project Phase</th>
<th>Key Deliverables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan Risk Management</td>
<td>Planning</td>
<td>Risk Management Plan</td>
</tr>
<tr>
<td>Identify Risks</td>
<td>Planning</td>
<td>Risk register</td>
</tr>
<tr>
<td>Perform Qualitative Risk Analysis</td>
<td>Planning</td>
<td>Risk register updates</td>
</tr>
<tr>
<td>Perform Quantitative Risk Analysis</td>
<td>Planning</td>
<td>Risk register updates</td>
</tr>
<tr>
<td>Plan Risk Responses</td>
<td>Planning</td>
<td>Risk related contract decisions</td>
</tr>
<tr>
<td>Monitor and Control Risks</td>
<td>Monitoring and Controlling</td>
<td>Risk register updates</td>
</tr>
</tbody>
</table>

The practical application of Project Risk Management is a key element in the success of any project. The Project Risk Management process should form part of the project management routine at all stages of the Project Life-Cycle.

All too often though the application of Risk Management can fall by the wayside somewhat during the implementation phase of a project once the Project Team gets into the fast pace of the implementation phase, dealing with all the day to day issues that need to be resolved.

Failing to follow a structured Project Risk Management process for your projects in a self-disciplined manner will quickly lead to project failure.

The practical application of Project Risk Management is straightforward:

Applying a practical risk management process to your projects with the self-discipline and commitment to follow the process rigorously, you will underpin your chances of a successful outcome.

A simple way of looking at a Project Risk Management process is to split it into 3 key activities:

1. **Objective Setting**: Set the objectives for the Project Risk Management process to be used and align them with the overall objectives for undertaking the project - the criteria for success. Risk Registers are practical ways for logging identified risks so they may be managed effectively through the project risk management process.

2. **Risk Analysis**: Identify foreseeable risks and seek to understand the type of risk - is it commercial, health & safety related, operational etc.? For all risks identified, understand the likelihood and impact as well as any cause and effect relationships between risks.

3. **Monitoring**: Throughout the whole Project Life-Cycle, the level of risk facing the project should be measured in some way, as well as a measuring the effectiveness in responding to identified risks.

9.12.1.1. Objective setting

Project Risk Management objective setting processes should also consider and deal with the following:

**Risk or Opportunity?**

A practical Project Risk Management process, if applied properly, can also facilitate the identification of opportunities to improve the desired outcomes of your projects. Opportunities to bring previously unidentified benefits to the project, often mean some deviation from the project definition and implementation plan and can often be overlooked or dismissed due to the discipline of controlling the project as signed off.

By following a practical Project Risk Management process during the assessment of opportunities, risks associated with pursuing opportunities can be successfully managed during the course of seeking the benefits on offer - in a lot of cases pursuing opportunities can inherently mitigate previously identified project risks.

**Risk vs. Definition**

Different types of risk are present during different stages of the project life cycle, the largest project risks mainly present themselves during the early stages of a project, when the project definition has not been developed sufficiently, or risk details have not been worked through thoroughly enough. It therefore follows that as a project proceeds to completion its risk profile reduces the nearer to completion it gets.

With some projects, a level of residual risk may exist after the project has been completed, which will require continual monitoring and management.

**Foreseen and Unforeseen Risk**

Two areas of project risk management that you are likely to come across, with obvious descriptions, are Foreseen and Unforeseen risk.

Foreseen risks are those risks that your project team is able to anticipate and therefore have a good chance of managing appropriately. Foreseen risks are the principal focus of the project risk management process, as it is difficult to manage something you are not aware of (unforeseen).

However, to ignore unforeseen risks totally is not wise. Unforeseen risks are those that creep up on you and hit you totally unawares, and can consequently cause project failure very easily. Although the
specifics of unforeseen risks are unknown, it is likely that some provision can be made to accommodate the generic type of risk that could present itself in an unforeseen way.

A common pragmatic way around this issue is for the sponsoring organisation to put aside some level of central contingency fund to be made available should an unforeseen risk present itself. This fund would typically be held outside of the project budget, but within the sponsoring organisation’s financial budget.

Having established the objectives of your Project Risk Management process taking into account the impact and magnitude of the consequences of project failure.

9.12.1.2. Risk Analysis

The next step is to undertake a Risk Analysis of your project.

Qualitative & Quantitative Risk Analysis

If you do nothing else, the bare minimum you should be considering is the production of a list of risks facing your project and to rank that list in some way to allow you to focus on managing the most significant risks, but at the same time not losing sight of the less significant risks.

This ‘list’ in essence is the start of your Risk Register and should be the main vehicle for traveling along the Project Risk Management process, although the generic risk management process is in fact an iterative review.

During the early stages of the Project Life cycle, qualitative risk analysis is more often used than quantitative. During concept and feasibility stages of a project, the level of definition is not sufficiently defined to allow effective quantitative risk analysis.

Quantitative risk analysis techniques come into their own as the project definition gets better developed, and very often, quantitative risk analysis becomes an integral part of the definition development process, defining actions and implementation methodologies which mitigate or remove risks previously identified.

9.12.1.3. Monitoring and Control

Concept and Feasibility stages may see the creation of the Risk Register with risks identified and qualitatively ranked in order of importance for more in-depth consideration at the next stage of the project.

During the Pre-planning stage of the project, the risk register will be reviewed at least once again having taken some action against the most significant risks identified from the earlier definition stages. As the definition proceeds, some risks may have been eliminated, yet new risks may have presented themselves.

Some risks may still have only been assessed qualitatively and some of the more significant risks may have undergone a rigorous quantitative analysis. The priorities for management action will have most likely also changed.

During the Project Implementation and Handover stages of a project it’s more usual to review risks via the Risk Register on an ongoing basis as part of the project control activities and reporting requirements for the project - commonly on a monthly basis as a minimum.

Good practice suggests that the outcome of project risk management activities should be fed back into other projects as continuous learning.
After all, if a method of eliminating or mitigating a risk has proven successful, by capturing and sharing the successful risk management actions with others, similar risks associated with other projects can be managed more effectively, reducing the overall project risk exposure of the sponsoring organisation. In this sense, the Risk Management process becomes a feedback loop of learning and overall risk reduction.

1. A project risk is a potential source of deviation from the project plan. Project risks can have a negative or positive impact on the project. Project risks that are negative are called threats. Project risks that are positive are called opportunities.

2. Responses to threat include --
   - Reducing the probability of risk
   - Developing contingency plans
   - Passively accepting consequences.
   - Transferring risk

   Insurance is an example of transferring risk.

3. Non-critical risks should be documented. They should be revisited and reviewed regularly.

4. Risks are identified in all phases.
9.12.2. Developing a risk management plan

Description

During the Planning Stage, the project team identifies all significant project risks known during the planning stage and determines the likelihood, impact, and response strategy associated with each risk. Additionally, the team identifies processes and roles to control risks during the Execute and Control Stage of the project. Results are documented in the Risk Management Plan and Risk Register.

Rationale/Purpose

Factors that cause a risk to be realized may occur throughout the project life cycle. A Risk Management Plan helps assure satisfactory project results by specifying a process to follow during the Execute and Control Stage for detecting the occurrence of these factors and for responding to the resulting realized risks.

Who is involved?

- Project Manager
- Project Team
- Project Sponsor
- Customer
- Project Stakeholders

Result

- Risk Management Plan component of the Project Plan

The table below describe actions you perform to create a risk management plan.

<table>
<thead>
<tr>
<th>What to do</th>
<th>How to do it</th>
</tr>
</thead>
</table>
| 1. Hold risk management planning kick-off meeting | - Engage key stakeholders and risk management decision makers as identified in the Initiate Stage for every step in the Risk Management Plan development.  
- Prepare an agenda to review the risk management strategy and key components to be decided for the Risk Management Plan.  
- Hold the risk management planning kick-off meeting, document outcomes, and determine additional steps and assignments to complete the Risk Management Plan. |
| 2. Expand general areas of risk for the project into a detailed list of risks | - Begin with the areas of risk identified in the Initiate Stage.  
- Expand the list to identify all specific risks known within each area. Make the list as comprehensive as possible at this stage. The list will be continually updated throughout the Execute and Control Stage of the project as more is known about additional risks or risks that are no longer pertinent. |
3. Set guidelines for risk analysis approach

- With reference to the organisation’s general disposition toward risk likelihood and impact categories, set guidelines that define what type and level of analysis is needed.

**Options for type of analysis include:**

- A qualitative analysis of a risk, which determines the factors that would cause the deviation, the likelihood of its occurrence, and the impact were it to occur.
- A quantitative analysis of a risk, in which its likelihood is expressed as a probability and the impact of the deviation, is expressed as a monetary value.
- The option chosen for level of analysis depends on how comprehensive an assessment is needed for the particular project.

**Examples include:**

- Careful research or reliance on industry expertise regarding risks for projects of this nature.
- General sense of the key stakeholders regarding the risks for this project.

4. Define risk likelihood categories

- Risk likelihood categories can either be general “qualitative” measures, such as a scale from extremely unlikely to extremely likely, or specific “quantitative” ranges of probabilities.

5. Define risk impact categories

- Risk impact categories can be expressed either as general “qualitative” measures, such as an indication of what areas of the project deliverables or organization would be impacted, or as specific “quantitative” measures, such as monetary impacts.

6. Establish risk likelihood and impact values for each risk

- Assess and assign risk likelihood and impact values to each risk based on the categories defined. Document risk likelihood, impact, and type of analysis required (i.e., qualitative or quantitative) for each risk in a risk register.

7. Define the response for each risk

- For each risk, judge the likelihood and impact and determine an appropriate response strategy. List the response strategy and a specific response action in the risk register.

**Response strategies fall into four categories:**

- Avoidance. The avoidance strategy eliminates the possible deviation by changing the project deliverables against which
the deviation is defined.

- Mitigation. The mitigation strategy sets out to alter the likelihood or the impact of the risk.
- Transference. The transference strategy transfers the impact of the deviation to a third party.
- Acceptance. The acceptance strategy merely acknowledges the risk, but does not specify any immediate action to take in response to the risk, although a contingency plan should be defined.

Examples of specific response actions for each strategy include:

- Avoidance: For a negative risk, one could decide not to undertake the deliverable. For a positive risk or opportunity, one could exploit the opportunity by incorporating it into the project as a planned deliverable.
- Mitigation: For negative risks, take steps to reduce the probability that risk factors will cause a deviation from the project plan or to reduce the amount of deviation. For a positive risk, such as a cost savings opportunity, take steps to increase the likelihood or amount of the cost savings.
- Transference: Purchasing insurance is a classic risk transference strategy. On the positive side, a plan to share possible cost savings with a vendor as an incentive is an example of transference.
- Acceptance: Merely note that the risk is accepted.
9.13. Project stakeholder management

Stakeholders can, literally, make or break a project, by their support for a project or by their interference in a project. The cost of making a change based on a request by a stakeholder goes up throughout the project, so it is important to prevent changes by engaging the stakeholders as early as possible. That is why Identify Stakeholders is the only other process to be in the Initiating Process Group other than Create Project Charter, meaning that is undertaken even before the formal planning process starts.

Project Management is placing increasing emphasis on Stakeholder Management; it has elevated it from being just a part of Communications Management to its own knowledge area outright. This is because communicating with a stakeholder is not enough; you have to influence the stakeholder. “Influence” because you will not be in a position with some stakeholders to be a position of authority to coerce them, and have to rely on other forms of “soft power” or influence to be able to get them to do what you want them to do.

Project stakeholder management is comprised of the processes required to identify the people, groups, and organisations that can impact or be impacted by the project. It involves analysing stakeholder expectations in developing management strategies for effectively engaging stakeholders and project decisions and execution. Stakeholder management also focuses on continuous communications with stakeholders, managing conflict, and promoting appropriate stakeholder engagement in project decisions and activities.

The high level Project Stakeholder Management output elements, by Process Group, are:

<table>
<thead>
<tr>
<th>Initiating</th>
<th>Planning</th>
<th>Executing</th>
<th>Monitoring and Controlling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stakeholder register</td>
<td>Stakeholder Management plan</td>
<td>Stakeholder register CR's</td>
<td>Work Performance Info CR's</td>
</tr>
</tbody>
</table>

Project stakeholder management focuses on the processes required to identify the people, groups, or organisations that can either impact or be impacted by the project. Some of these processes include the following:

- Analysing stakeholder expectations and their impact on the project.
- Developing appropriate management strategies for engaging stakeholders.
- Implementing continuous communications with stakeholders to understand needs and expectations.
- Fostering stakeholder engagement in the project for decisions and activities.
- Focusing on stakeholder satisfaction as a key project objective.
- Identify Stakeholders is the process of identifying all individuals or organisations that can be positively or negatively impacted by the project, and documenting their influence, impact, interest, and involvement on project success.

This is a key area in the project management process, as many projects fail due to a lack of complete stakeholder identification. Most projects will have a large number of stakeholders, and it is a project manager's job to identify stakeholders and understand the impact of the project on their specific business areas. In this respect, the project manager's job amounts to a relationship management function.
As part of the Manage Stakeholder Expectations process, the project manager works with the stakeholders, understands and addresses their needs and expectations. The Inputs, Tools and Techniques, and Output of Manage Stakeholder Expectations process is given below.

**Manage Stakeholder Expectations Process**

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Tools &amp; Techniques</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stakeholder register</td>
<td>Communication methods</td>
<td>Organisational process assets updates</td>
</tr>
<tr>
<td>Stakeholder management strategy</td>
<td>Interpersonal skills</td>
<td>Change requests</td>
</tr>
<tr>
<td>Project management plan</td>
<td>Management skills</td>
<td>Project management plan updates</td>
</tr>
<tr>
<td>Issue log</td>
<td></td>
<td>Project document updates</td>
</tr>
<tr>
<td>Change log</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organisational process assets</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

During **Stakeholder Analysis** the following activities are conducted:

- Identify all potential stakeholders and relevant information about them, such as their roles, departments, interests, knowledge levels, expectations, and influence levels. Key stakeholders are those in decision making or management roles. Also identify other stakeholders during interviews with stakeholders.
- Identify the potential project impact or support the stakeholder could provide, classifying them to help define an approach strategy. Prioritize them.
- Assess how key stakeholders are going to react or respond to various project situations and issues, to plan how to influence them to enhance their support and mitigate their negative impact.

The **Stakeholder Register** contains all the details related to identified stakeholders, including:

- Identification, such as name, position, role, contact information
- Assessment, such as major requirements, main expectations, potential influence on the project and in what phase
- Classification, such as internal or external, attitude toward project (support, neutral, resister)

The **Stakeholder management strategy** is the approach to be used to increase support and minimize resistance, including:

- Who can significantly impact the project
- Desired level of participation in the project
- Stakeholder groups, and their management, as groups

The central role of stakeholders in the successful delivery of projects is becoming increasingly recognised. However, whilst critical to success, these roles are neither passive nor predetermined. The
organisation has significant opportunities to influence stakeholder’s perceptions and expectations for the benefit of both the stakeholders and the project; but only when there are effective relationships in place with each key stakeholder.

Identifying, mapping and prioritising a project’s stakeholder community are only the beginning. Projects and other initiatives can only be considered successful when their key stakeholders acknowledge they are a success. This requires the delivery team to effectively engage with each of its key stakeholders to understand and manage their expectations and then deliver the outcome to meet or exceed these ‘managed expectations’. Expectations are never ‘fixed’; effective communication can help change perceptions and expectations to make them realistic and achievable. Conversely, ineffective communications can create the perception of failure in the mind of a stakeholder even when the deliverable is ‘on time, on budget and delivering the specified scope’.

Engaging effectively and ethically with key stakeholders to help create a successful project outcome requires significant levels of skill and maturity. A Stakeholder Relationship Management Maturity (SRMM) model defines five levels of maturity and suggests a route most organisations can follow to progress from ‘Level 1’ to ‘Level 5’.

The 5 levels of SRMM are:

- Ad hoc: some use of processes
- Procedural: focus on processes and tools
- Relational: focus on the Stakeholders and mutual benefits
- Integrated: methodology is repeatable and integrated across all programs and projects
- Predictive: used for health checks and predictive risk assessment and management.

The following table serves as an implementation guide for SRMM:

<table>
<thead>
<tr>
<th>SRMM Stage</th>
<th>Features</th>
<th>Methodology Steps</th>
<th>Reporting / Tools</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ad hoc: some use of processes</td>
<td>One area recognises the need for improved Stakeholder Management (SHM)</td>
<td>Generally focuses on simplified selected steps. Sometimes just Steps 4 and 5</td>
<td>Self-developed tools - Word templates - Spreadsheet lists</td>
<td>Requires continuous and significant management ‘push’ to maintain impetus</td>
</tr>
<tr>
<td>2. Procedural: focus on processes and tools</td>
<td>SHM introduced as part of implementation of consistent processes</td>
<td>Sometimes all five steps but truncated and simplified</td>
<td>Standardised tools - Word templates - Spreadsheet with macros - Simple database</td>
<td>Require continuous and significant management ‘push’ to maintain impetus</td>
</tr>
<tr>
<td>3. Relational: focus on the stakeholders and mutual benefits</td>
<td>Recognition of usefulness for competitor analysis, or support for mergers/acquisition</td>
<td>All five steps implemented. Move towards valuing insights / information in decision making</td>
<td>Fully functional tools - Spreadsheet with macros - Sophisticated databases</td>
<td>Useful for specific applications or events; rarely with an intention of continuous application</td>
</tr>
<tr>
<td>4. Integrated:</td>
<td>‘Business as usual’ application using the full methodology for all projects and selected operational work</td>
<td>Steps 1 – 5 with Step 4: engage and Step 5: being vital for evidence of success</td>
<td>Graphic reports, visualisation, engagement profiles, etc., used in management reports and KPIs</td>
<td>The methodology and tool are used as a demonstration of repeatable application within that part of the organisation</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>methodology is repeatable and integrated</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Predictive:</td>
<td>Implementation of the full methodology and supporting tools tool</td>
<td>Steps 1 - 5. ‘Lessons Learned’ &amp; comparative data. Integrated data across programs, etc.</td>
<td>Trend reporting, pro-active risk identification (unusual profiles) Comparison between projects and different categories of work</td>
<td>Organisation –wide and complete focus on continuous improvement as competitive advantage</td>
</tr>
<tr>
<td>used for health checks, predictive risk assessment and management:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
10. Roles of the consultant/public bodies

Whether projects are direct managed by the public body, or a consultant is used, it is essential that clear roles and responsibilities are defined. In certain instances, these functions, roles and responsibilities may differ based on agreed the nature and complexity of projects, scope definition and project management expertise available.

10.1. Role of the consultant

The Role of the Project Management Consultant can be a complex one. The role has many different aspects and means different things in different organisations. Some of the Project Management Consultant Responsibilities and Duties are as follows:

- Manage projects and related specific activities within given constraints of time, budget and quality.
- Ensure scope, schedule and costs are reasonable and achievable.
- Allocate work among team members and provide guidance regularly.
- Conduct periodic and post-project reviews to ensure project is on track.
- Coordinate functional perspectives from within and outside project teams.
- Ensure all project documentation is updated and conveyed to relevant stakeholders on time.
- Integrate self into client environment to effectively lead project team building positive professional relationships with clients and associates.
- Define objectives, requirements and assumptions necessary to structure management project.
- Plan, schedule and control activities to fulfill identified objectives applying technical, theoretical and managerial skills to satisfy project requirements.
- Enforce and develop integrated development plan representing appropriate level of detail.
- Develop task interdependency and project tactics with overall project strategy.
- Establish and maintain high performing team and serve as project advocate within organisation.
- Consult and lead efforts of individual, team, client and other resources associated with project activity.
- Ensure alignment on project goals and deliverables.
- Lead risk management within project management team.
- Ensure risks have appropriate mitigation and contingency plans.

Some benefits of hiring a Project Management Consultant include:

**Return on investment:** Consultants add value by using their skills and expertise to help deliver an outcome, solution, service or mitigate risk that provides a meaningful ‘return on investment’ to a client.

**Speed:** Since consultants are already experienced and trained they can be deployed rapidly – sometimes within days as opposed to weeks or months. Their experience means they can engage promptly with the situation, and can quickly become effective in the client organisation.
Expertise: Project Management Consultants typically come into an organisation at a relatively senior level and are expected to provide expertise and leadership.

Objectivity: Since they come from outside the client organisation they are unencumbered by company politics or culture, and can provide a fresh perspective.

Accountability: Project Management Consultants are not simply advisors. They are also practitioners and will take responsibility for and manage a project or programme.

Effectiveness: Ideally, in order to be effective, a PM consultants will need to work well with senior management in the client company and also be granted some authority and credibility to effect significant change or transition within a company.

Commitment: PM consultants should maintain high professional standards. They rely on their reputation and know that future work relies upon referrals and a successful track record.

10.2. Role of public bodies

The roles of public bodies are to take ownership of the project being conducted. The public body should ensure it has the proper structures, such as a project/programme/portfolio management office ensuring the efficiency of the delivery mechanisms of the public portfolio of projects, through the provision of project management and coordination services to ensure on time and on budget project delivery. The functions of Project/Portfolio Management Office include:

- developing and implementing project management systems and processes to enhance the department’s organisational performance;
- assisting line function management to identify project leaders and team members to formulate project teams;
- developing and implementing standards, processes, and methodologies that improve individual project performance capabilities of the organisation;
- facilitating the public body’s ability to manage its entire collection of projects as one or more inter-related portfolios, and serving as a single source of information on project activity across the enterprise;
- facilitating governance of, best practices for and adherence to, project control and quality standards;
- tracking project execution, issues and risks to ensure on-time and on-budget project delivery;
- providing monthly and quarterly project reports to management; and
- institutionalising project management discipline in the organisation by projectising business plans and staging information and knowledge management sessions.
11. Construction Project Management

The following items are specifically considered with regard to construction project management:

11.1. Commissioning Phase of a project

The programming of capital projects is shaped by the strategic plan of an organisation, which is influenced by market demands and resources constraints. The programming process associated with planning and feasibility studies sets the priorities and timing for initiating various projects to meet the overall objectives of the organisations. However, once this decision is made to initiate a project, market pressure may dictate early and timely completion of the facility.

11.1.1. Pre-Project Planning

Even before design and construction processes begin, there is a stage of "pre-project planning" that can be critical for project success. In this process, the project scope is established. Since construction and design professionals are often not involved in this project scope stage, the terminology of describing this as a "pre-project" process has arisen. From the owner's perspective, defining the project scope is just another phase in the process of acquiring a constructed facility.

The danger of poor project definition comes from escalating costs (as new items are added) or, in the extreme, project failure. A good definition of scope allows all the parties in the project to understand what is needed and to work towards meeting those needs. Some items in the scope definition checklist include:

- business strategy for building use, justification, plan, economic analysis, facility requirements, expansion/alteration consideration, site selection issues and project objectives;
- owner philosophy with regard to reliability, maintenance, operation and design;
- project requirements for value engineering, design, existing facility, scope of work review, schedule and budget;
- site information including applicable regulatory reporting and permits requirements;
- building programming including room by room definitions for use, finishes, interior requirements, heating, ventilating and air conditioning;
- design parameters including all components and a constructability analysis; and
- equipment including inventory, locations and utility requirements.

In order to gain time, some owners are willing to forego thorough planning and feasibility study so as to proceed on a project with inadequate definition of the project scope. Invariably, subsequent changes in project scope will increase construction costs. This may be attributed in large part to the uncertainties inherent in construction projects. However, some projects are clearly unsuccessful and abandoned before completion, and their demise must be attributed at least in part to inadequate planning and poor feasibility studies.

The sponsor holds the key to influence the construction costs of a project because any decision made at the beginning stage of a project life cycle has far greater influence than those made at later stages. Therefore, a sponsor should obtain the expertise of professionals to provide adequate planning and feasibility studies. Many sponsors do not maintain an in-house engineering and construction
management capability, and they should consider the establishment of an ongoing relationship with outside consultants in order to respond quickly to requests.

Finally, the initiation and execution of capital projects places demands on the resources of the sponsor and the professionals and contractors to be engaged by the sponsor. For very large projects, it may bid up the price of engineering services as well as the costs of materials and equipment and the contract prices of all types. Consequently, such factors should be taken into consideration in determining the timing of a project.

11.1.2. Effects of Project Risks on Organisation

The uncertainty in undertaking a construction project comes from many sources and often involves many participants in the project. Since each participant tries to minimise its own risk, the conflicts among various participants can be detrimental to the project. Only the sponsor has the power to moderate such conflicts as it alone holds the key to risk assignment through proper contractual relations with other participants. Failure to recognise this responsibility by the sponsor often leads to undesirable results. In recent years, the concept of "risk sharing/risk assignment" contracts has gained acceptance by government. Since this type of contract acknowledges the responsibilities of the sponsor, the contract prices are expected to be lower than those in which all risks are assigned to contractors.

In approaching the problem of uncertainty, it is important to recognise that incentives must be provided if any of the participants is expected to take a greater risk. The willingness of a participant to accept risks often reflects the professional competence of that participant as well as its propensity to risk. However, society's perception of the potential liabilities of the participant can affect the attitude of risk-taking for all participants. When a claim is made against one of the participants, it is difficult for the public to know whether a fraud has been committed, or simply that an accident has occurred.

Risks in construction projects may be classified in a number of ways. One form of classification is as follows:

- Socioeconomic factors
- Environmental protection
- Public safety regulation
- Economic instability
- Exchange rate fluctuation
- Organisational relationships
- Contractual relations
- Attitudes of participants
- Communication
- Technological problems
- Design assumptions
- Site conditions
- Construction procedures
- Construction occupational safety

The environmental protection movement has contributed to the uncertainty for construction because of the inability to know what will be required and how long it will take to obtain approval from the regulatory agencies. The requirements of continued re-evaluation of problems and the lack of
definitive criteria which are practical have also resulted in added costs. Public safety regulations have similar effects, which have been most noticeable in the energy field involving nuclear power plants and coal mining. The situation has created constantly shifting guidelines for engineers, constructors and owners as projects move through the stages of planning to construction. These moving targets add a significant new dimension of uncertainty which can make it virtually impossible to schedule and complete work at budgeted cost. Economic conditions of the past decade have further reinforced the climate of uncertainty with high inflation and interest rates.

Uncertainty stemming from regulatory agencies, environmental issues and financial aspects of construction should be at least mitigated or ideally eliminated. Owners are keenly interested in achieving some form of breakthrough that will lower the costs of projects and mitigate or eliminate lengthy delays. Such breakthroughs are seldom planned. Generally, they happen when the right conditions exist, such as when innovation is permitted or when a basis for incentive or reward exists. However, there is a long way to go before a true partnership of all parties involved can be forged.

During periods of economic expansion, major capital expenditures are made by industries and bid up the cost of construction. In order to control costs, some owners attempt to use fixed price contracts so that the risks of unforeseen contingencies related to an overheated economy are passed on to contractors. However, contractors will raise their prices to compensate for the additional risks.

The risks related to organisational relationships may appear to be unnecessary but are quite real. Strained relationships may develop between various organisations involved in the design/construct process. When problems occur, discussions often center on responsibilities rather than project needs at a time when the focus should be on solving the problems. Cooperation and communication between the parties are discouraged for fear of the effects of impending litigation. This barrier to communication results from the ill-conceived notion that uncertainties resulting from technological problems can be eliminated by appropriate contract terms.

The risks related to technological problems are familiar to the design/construct professions which have some degree of control over this category. However, because of rapid advances in new technologies which present new problems to designers and constructors, technological risk has become greater in many instances. Certain design assumptions which have served the professions well in the past may become obsolete in dealing with new types of facilities which may have greater complexity or scale or both. Site conditions, particularly subsurface conditions which always present some degree of uncertainty, can create an even greater degree of uncertainty for facilities with heretofore unknown characteristics during operation. Because construction procedures may not have been fully anticipated, the design may have to be modified after construction has begun.

If each of the problems cited above can cause uncertainty, the combination of such problems is often regarded by all parties as being out of control and inherently risky. Thus, the issue of liability has taken on major proportions and has influenced the practices of engineers and constructors, who in turn have influenced the actions of the sponsor.

Many sponsors have begun to understand the problems of risks and are seeking to address some of these problems. For example, some sponsors are turning to those organisations that offer complete capabilities in planning, design, and construction, and tend to avoid breaking the project into major components to be undertaken individually by specialty participants. Proper coordination throughout the project duration and good organisational communication can avoid delays and costs resulting from
fragmentation of services, even though the components from various services are eventually integrated.

Attitudes of cooperation can be readily applied to the private sector, but only in special circumstances can they be applied to the public sector. The ability to deal with complex issues is often precluded in the competitive bidding which is usually required in the public sector. The situation becomes more difficult with the proliferation of regulatory requirements and resulting delays in design and construction while awaiting approvals from government officials who do not participate in the risks of the project.

Although sponsors and contractors may have different perceptions on project management for construction, they have a common interest in creating an environment leading to successful projects in which performance quality, completion time and final costs are within prescribed limits and tolerances.

11.2. Environmental and Land Issues

Establishment of rights and title over and use of land is key to infrastructure projects. The government needs to ensure it has title in assets and obtain title to assets that it or the public is paying for over time. Consideration of the potential impact on the environment and society of an infrastructure project is key to planning and implementation of a project.

Factors which need to be considered regarding land and environmental issues are:

- Restrictions on transfer of rights over public assets to private sector
- Clear title in land and land registration
- Vesting of rights in use of land
- Acquisition of land for project from third parties
- Expropriation
- Planning permission
- Environmental and social issues and environmental assessment

11.2.1. Restrictions on transfer of rights in public assets to private sector operator

Projects may require the transfer of rights in public assets to the private sector operator. The awarding authority may wish to transfer rights over, or ownership of, project assets to the project assets to the project company or operator and there may be a requirement for the project company to transfer ownership of assets to the awarding authority after construction or at the end of the project.

The awarding authority will want to find a mechanism that gives the operator sufficient rights to enable it to fulfil its obligations while allowing the awarding authority to maintain a sufficient interest in the public assets and rights of reversion.

The law of the country may include restrictions on transfer of rights over public assets, such as:

- to what extent can the operator receive rights over land and/or assets from the government?
  Are there any limitations imposed by law on the transfer of rights over land and public assets?

- are there restrictions on whether interests in land can be transferred to a foreign entity?
• can the operator transfer, sub-licence, or dispose of rights in those assets or land?
• can assets be removed, replaced or demobilised?
• to what extent can lenders obtain security over the assets and land?
• is the operator protected by law in the event that government expropriates the assets or land?
• what liabilities run with the assets transferred (e.g., environmental liabilities, occupier's liability, etc.).

11.2.2. Clear title in interest in land and land registration

In most projects, particularly where the service provider is investing in existing or new infrastructure, the service provider will want assurance that it has rights in the land where the infrastructure is to be built or whether this is ownership of the land or some right less than ownership (such as lease or license over the land).

Where third party finance is being provided, the lender may have as its sole source of security a charge over the assets and will want certainty that there is a clear form and effective method of establishing a security interest over the land or land rights.

A host government will be cautious about granting any interest in the land greater than is necessary to enable the project to proceed.

It will be important to consider if there is a clear method of registering and enforcing rights of property in the country. The service provider and lender will be concerned that there are no competing third party claims to the land to be used for the project.

11.2.3. Vesting of Rights of Access to and use of Third Party Land

The service provider may be responsible for installing and/or maintaining assets on third party land, such as laying pipes or lines across third party or public land. For this, it will need rights of land use such as rights of access and power to dig trenches, etc.

These rights are usually granted by law to the utility or authority - the parties will need to check that the awarding authority has such rights and that the awarding authority has the right to delegate or vest these rights in the service provider. If it cannot delegate the powers, then it will need to continue to perform these activities during the contract period and the contract will have to allocate responsibilities and liabilities for this between the parties.

It will also be important to determine the process for diverting or closing public roads and highways to enable the project to proceed. In the case of construction of a road, railway or bridge, this is likely to be for an extended period.

11.2.4. Acquisition of Land for Project from Third Parties

Governments should ask the following key questions:

• Is it going to be necessary to acquire land for the project to proceed? For example, in highway, railway and dam projects a considerable amount of land will need to be acquired for the project to proceed.
• Has the government already acquired the land?

• If not, does the government have power to compulsorily purchase land? Is this something that the government has a right to do?

• Do landowners have right to legal redress against such compulsory acquisition? Do they have a right of resettlement?

• Do landowners have a right to petition to stop the resettlement from proceeding?

• Is the government required to compensate citizens? If so, are there set levels or formulae for assessing compensation?

• Can the government acquire land on behalf of a third party?

11.2.5. Expropriation

Expropriation is the act of a government removing the property rights of a private entity or person. Expropriation can be direct, as in nationalisation or condemnation by the government of a roadway, or indirect, such as eliminating an operator's right to collect tolls and thereby nullifying the object of the operator's investment.

• Are there provisions in the law of the host country setting out the levels of compensation available in the event of expropriation?

• Is the compensation likely to be adequate to cover the sunken investment costs of the operator and the costs of debt service?

• Does the law limit or prevent the awarding authority from providing compensation in the contract different from that under the law?

11.2.6. Planning permission

Projects invariably give rise to planning issues, whether involving the creation or extension of facilities. The government, as well as other interested stakeholders such as local authorities and citizens will be concerned to ensure that there is the least possible disruption caused by the project and that existing amenities and services will not be affected.

If a county does not have any established planning laws, it may wish to introduce them, whether for the specific project or more broadly, to cover anything from unsightly buildings, access to facilities, harmony with the neighbouring countryside, etc.

If the country has a protracted planning process, however, then this can delay the commencement of often much needed infrastructure projects for years and so a balance should be struck between ensuring that projects cause minimal disruption and ensuring the planning process does not cause undue delays to projects.

A service provider will be keen to leave the duty of obtaining planning permission with the awarding authority as it is likely have greater influence over the planning authority and be more familiar with the planning processes. At the very least, the service provider will require a contractual obligation on the awarding authority to provide support in obtaining such permission and should seek to include in the delay triggers resulting in an extension of time to complete construction works delays in obtaining planning permission.
11.2.7. Environmental and social issues and environmental assessment
Potential damage to the environment and impact on society are key issues when planning an infrastructure project – it is important for the government to determine whether the detrimental impact on the environment or on society from a project outweighs its potential benefits and, where a project is necessary, how the environmental and/or social impact can be kept to a minimum.

These standards should be included in the parameters of the project agreement but there may also be certain standards that are required to be met by law. The government will also need to consider how to monitor the operator to ensure compliance with these standards and the consequences of the project company or operator failing to meet these standards at the outset and during the project term – for example, a government will be keen to ensure that the service provider is discouraged from polluting or even allowing pollution – and indeed polluters may face criminal liability for their offence in the particular country.

11.2.8. International Finance Institutions Requirements
Many international finance institutions, including the World Bank, and other lending institutions, will require adherence to environmental and social principles and environmental impact assessments to be carried out before a project can proceed.

11.2.9. Limitation of Environmental Liability
The developer or operator will seek to limit the circumstances where it is penalised for breaching environmental standards where such breach is not within its control – for example, a wastewater treatment plant operator will wish to avoid prosecution or even liability for pollution caused by a pollutant in the influent which the treatment plant cannot treat - or will at least want to have the power to pursue the polluter to stop the pollution and/or obtain compensation. The developer or operator will therefore need to determine whether it is possible to transfer civil or criminal liability for pollution to a third party or avoid prosecution if it can show that it was not the cause of the pollution - some legal systems allow for this but many do not.

The developer or operator will also seek to limit its liability for environmental damage - whereas the government will want to ensure that the developer or operator is incentivised to comply with environmental standards and has ample insurance cover for any environmental damage.
11.3. Management of Design and Construction Phase

11.3.1. Design and Construction as an Integrated System

In the planning of facilities, it is important to recognise the close relationship between design and construction. These processes can best be viewed as an integrated system. Broadly speaking, design is a process of creating the description of a new facility, usually represented by detailed plans and specifications; construction planning is a process of identifying activities and resources required to make the design a physical reality. Hence, construction is the implementation of a design envisioned by architects and engineers. In both design and construction, numerous operational tasks must be performed with a variety of precedence and other relationships among the different tasks.

Several characteristics are unique to the planning of constructed facilities and should be kept in mind even at the very early stage of the project life cycle. These include the following:

- Nearly every facility is custom designed and constructed, and often requires a long time to complete.
- Both the design and construction of a facility must satisfy the conditions peculiar to a specific site.
- Because each project is site specific, its execution is influenced by natural, social and other locational conditions such as weather, labour supply, local building codes, etc.
- Since the service life of a facility is long, the anticipation of future requirements is inherently difficult.
- Because of technological complexity and market demands, changes of design plans during construction are not uncommon.

In an integrated system, the planning for both design and construction can proceed almost simultaneously, examining various alternatives which are desirable from both viewpoints and thus eliminating the necessity of extensive revisions under the guise of value engineering. Furthermore, the review of designs with regard to their constructability can be carried out as the project progresses from planning to design. For example, if the sequence of assembly of a structure and the critical loadings on the partially assembled structure during construction are carefully considered as a part of the overall structural design, the impacts of the design on construction work and on assembly details can be anticipated. However, if the design professionals are expected to assume such responsibilities, they must be rewarded for sharing the risks as well as for undertaking these additional tasks. Similarly, when construction contractors are expected to take over the responsibilities of engineers, such as devising a very elaborate scheme to erect an unconventional structure, they too must be rewarded accordingly. As long as the owner does not assume the responsibility for resolving this risk-reward dilemma, the concept of a truly integrated system for design and construction cannot be realised.

The following table shows the recommended responsibility for various tasks related to a construction project:

<table>
<thead>
<tr>
<th>Recommended Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Owner</th>
<th>Design Professional</th>
<th>Construction Contractor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Provide adequate time and funding for drawing preparation and review</td>
<td>Prime</td>
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<td>2.</td>
<td>Arrange for structural design</td>
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<td>3.</td>
<td>Provide structural design</td>
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<td>4.</td>
<td>Establish overall responsibility for connection design</td>
<td>Prime</td>
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<td>5.</td>
<td>Accomplish connection design (by design professional)</td>
<td>Prime</td>
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<td>6.</td>
<td>Alternatively, provide loading requirement and other information necessary for drawing preparation</td>
<td>Prime</td>
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<td>7.</td>
<td>Alternatively, accomplish some or all of connection design</td>
<td></td>
<td>Prime</td>
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<tr>
<td>8.</td>
<td>Specify drawing requirements and procedures</td>
<td>Review</td>
<td>Prime</td>
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<tr>
<td>9.</td>
<td>Approve proper scheduling</td>
<td>Prime</td>
<td>Assisting Assisting</td>
</tr>
<tr>
<td>10.</td>
<td>Provide drawing and submit the drawing on schedule</td>
<td></td>
<td>Prime</td>
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<tr>
<td>11.</td>
<td>Make timely reviews and approvals</td>
<td>Prime</td>
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<tr>
<td>12.</td>
<td>Provide erection procedures, construction bracing, shoring, means, methods and techniques of construction, and construction safety</td>
<td></td>
<td>Prime</td>
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</tbody>
</table>

### 11.3.2. Design Methodology

While the conceptual design process may be formal or informal, it can be characterised by a series of actions: formulation, analysis, search, decision, specification, and modification. At the early stage in the development of a new project, these actions are highly interactive. Many iterations of redesign are expected to refine the functional requirements, design concepts and financial constraints, even though the analytic tools applied to the solution of the problem at this stage may be very crude.

### 11.3.3. Construction Site Environment

While the general information about the construction site is usually available at the planning stage of a project, it is important for the design professionals and construction manager as well as the contractor to visit the site. Each group will be benefited by first-hand knowledge acquired in the field.
For design professionals, an examination of the topography may focus their attention to the layout of a facility on the site for maximum use of space in compliance with various regulatory restrictions. In the case of industrial plants, the production or processing design and operation often dictate the site layout. A poor layout can cause construction problems such as inadequate space for staging, limited access for materials and personnel, and restrictions on the use of certain construction methods. Thus, design and construction inputs are important in the layout of a facility.

The construction manager and the contractor must visit the site to gain some insight in preparing or evaluating the bid package for the project. They can verify access roads and water, electrical and other service utilities in the immediate vicinity, with the view of finding suitable locations for erecting temporary facilities and the field office. They can also observe any interference of existing facilities with construction and develop a plan for site security during construction.

In examining site conditions, particular attention must be paid to environmental factors such as drainage, groundwater and the possibility of floods. Of particular concern is the possible presence of hazardous waste materials from previous uses. Cleaning up or controlling hazardous wastes can be extremely expensive.

**11.3.4. Construction Planning**

The development of a construction plan is very much analogous to the development of a good facility design. The planner must weigh the costs and reliability of different options while at the same time insuring technical feasibility. Construction planning is more difficult in some ways since the building process is dynamic as the site and the physical facility change over time as construction proceeds. On the other hand, construction operations tend to be standard from one project to another, whereas structural or foundation details might differ considerably from one facility to another.

Forming a good construction plan is an exceptionally challenging problem. There are numerous possible plans available for any given project. While past experience is a good guide to construction planning, each project is likely to have special problems or opportunities that may require considerable ingenuity and creativity to overcome or exploit. Unfortunately, it is quite difficult to provide direct guidance concerning general procedures or strategies to form good plans in all circumstances.

The planning process for construction projects consists of three stages that take place between the moment in which a planner starts the plan for the construction of a facility to the moment in which the evaluation of the final output of the construction process is finished. The stages are as follows:

- Estimation
- Monitoring and control
- Evaluation

The estimate stage involves the development of a cost and duration estimate for the construction of a facility as part of the proposal of a contractor for the project. It is the stage in which assumptions of resource commitment to the necessary activities to build the facility are made. A careful and thorough analysis of different conditions imposed by the construction project design and by site characteristics are taken into consideration to determine the best estimate. The contractor has to look for the time-cost combination that will allow the contractor to be successful in his commitment. When changes are done, they should improve the estimate, taking into account not only present effects, but also future
outcomes of succeeding activities. It is very seldom the case in which the output of the construction process exactly echoes the estimate offered.

In the **monitoring and control stage** of the construction process, the constructor has to keep constant track of both activities’ durations and ongoing costs. It is misleading to think that if the construction of the facility is on schedule or ahead of schedule, the cost will also be on the estimate or below the estimate, especially if several changes are made. Constant evaluation is necessary until the construction of the facility is complete. When work is finished in the construction process, and information about it is provided, the third stage of the planning process can begin.

The **evaluation stage** is the one in which results of the construction process are matched against the estimate. Only when the outcome of the construction process is known is it able to evaluate the validity of the estimate. It is in this last stage of the planning process that it can be determined if the assumptions were correct. If they were not or if new constraints emerge, he/she should introduce corresponding adjustments in future planning.
11.4. Project Claim Management

Claim Management is an inevitable process in Construction Project Management, to reach successfully the desired results. The requirement in first place is to avoid claim through managing the breeding grounds with all earnest, alignment of documents, and eventually entertaining an entitlement in an efficient and business-like manner.

Considerate approach for early settlement on issues between parties is always cheaper and leads to win/win results. The construction project, mostly a large undertaking, demands one to prevent stained relationship of parties, stalemates, delays, disputes, or loss of resources that cause or carry the potential force for litigious and arbitral action of the parties, for resolution in contract.

Claim is a management issue and the process needs efficient and effective management during the entire life cycle of a project.

The construction project generally has four well-recognised phases:

| 1. Pre-tender     | - initial concept, design of contract-documentation, |
|                  | - pre-tender meetings and up to invitation of tenders |

| 2. Contract Formulation | - preparation and submission of tenders, tender assessments, pre-contract negotiations and contract formulation |

| 3. Construction       | - during construction up to substantial completion |

| 4. Post completion    | - settlement of outstanding issues after substantial completion & finalisation of accounts |

Mostly claims relate to the encountered conditions or events, which occur during the construction phase. However, the seeds of claim and nutrients essential for development are contained in the contract documentation and the information supplied or not supplied in pre-contract phase.

The greatest opportunity to prevent claims ends once tender-documents are finalised and the contract is awarded.

There are two significant elements in the control of the project owner and his professional-team.

The first is the efforts expended in pre-contract preparation as regards the reliability and completeness of information, design and documentation aligned to purpose.

The second is the development of scheme for risk distribution, plan for management, selection of Form of Contract, and procedure for dealing with emergent issues.

Some form of conflict is inevitable; the preponderance of opinion is that “Construction conflicts are endemic in the industry” for involvement of stakeholders, having varied requirements and
expectations associated with project, for particular need. Further the tendency of contracts to generate dispute, because of externality of interpretation; a contract cannot “specify their own indexical” by providing how they will be read or used by parties and interpreted differently in conjunction with documents prepared by various parties.

The problems fall into a series of broad categories. They can be grouped into two headings – those, which have their origin in the planning of the project, and those, which are caused by problems during the construction of works.

11.4.1. Claim Management

The Management Processes that requires prevention or mitigation of construction claims and the expeditious handling when they do occur, for earliest settlement can be viewed from two perspectives: the party making the claim and the one defending against it.

A claim is, “A demand for something due or believed to be due”, usually the result of an action or direction. In construction, “something” is usually additional compensation for work claimed to be extra to the contract or an extension of time for completion or both. What distinguishes a claim from a change is the element of disagreement between the parties as to what is due or whether or not anything is due. If agreement is reached, then the claim disappears and becomes a change. If not, the claim may proceed to negotiation, mediation, arbitration, and finally, to litigation before it is ultimately resolved. Often claims are thought of in terms of the contractor making claims against the owner or other prime party and by subcontractors against the contractor. However, claims can also originate from the owner/prime party who believes that some requirement of the contract is not being performed by the contractor.
Therefore the logical processes for claim management at different phases of project are:

1. Claim Prevention
2. Claim Mitigation
3. Pursuing Claims
   a) Claim Identification
   b) Claim Quantification
4. Claim Resolution

11.4.2. Claim Prevention
The prevention process starts with formulation of contract documents and development of integrated project plan with sufficient knowledge of the purpose. Clearly, the best way to prevent claims is to have no claims to prevent. Thus, the emphasis is on how to avoid or prevent claims from arising. Alignment of purpose, and development of all documents related with Contracts for a project are all prepared in same line. The ingredients are management scheme, identified risk distribution to ones in best position to control and defined responsibilities. After the award of contract, the opportunity to prevent claims ends.

The necessary inputs required to the Claim Prevention process are:

- **Scope Assessment:** An assessment of work that needs to encompass all requirements and satisfy the purpose.
- **Required Distribution of Information:** Plan for distribution of necessary information to project players who prepare responses to risk.
- **Management Scheme of Project:** The required management scheme that defines the responsibilities of major players and stakeholders.
- **Requirement of risk sharing scheme:** The scheme of the risk sharing among the major players and stakeholders.
- **Time frame for project completion:** An assessment of logical time frame for completion.
- **Dependency:** Project players understanding of alignment to the defined purpose and dependency of responsibilities for risk sharing.

Tools and Techniques that help claim prevention:

- **Methodology for Economic Exchange:** Methodology with win/win outcomes that best serves the scheme of management and risk sharing of project players.
- **Identification & Assessments of Project Scope:** Everything that is necessary to add value or is required to serve the purpose of project needs to be incorporated in Project Scope.
- **Information Sharing:** Distribute information in accordance with the responsibility and risk carried by project player.
- **Template:** Tested methodology and lessons learned on similar project.
• **Expert Judgment**: Independent views of experts of the field to ascertain that the approach adapted will lead to win/win results.

• **Alignment of Documents**: All documents are aligned with the purpose for a Contract.

• **Dispute Resolution**: A reliable mechanism for fast resolution of dispute

• **Partnering Approach**: Respect for project player’s independence and commercial interest.

• **Monitoring & Control**: The system and team developed for project monitoring and control

• **Education & Training**: Project life cycle continuous education and training is necessary to develop an atmosphere of trust, respect for purpose and direction setting through the complexities.

Desired outcomes from the Claim Prevention process are:

• **Project scope**: Scope of work (explicit and implicit) to satisfy the purpose of the project.

• **Contract form**: Well defined risk sharing and responsibility policy, the Contract Form may be:
  - Cost-plus-fee
  - Management
  - Lump sum
  - Quoted Rate for Bill of Quantities
  - Design and construct
  - BOT

• **Contract Documents**: All documents carefully aligned with the purpose.

• **Dispute Resolution Methodology**: An independent dispute resolution board is defined.

• **Trust Building & Training Plan**: Action plan is developed to train & educate the team of project players on Claim/Contract Management during progression for trust building.
11.4.3. Claim Mitigation

Construction activities are generally carried out in complex, highly sensitive and changing environments. Perfect conditions and control on everything are next to impossible. Best approach is to mitigate the possibilities of arising claim all through progression of the contract. Thus, the emphasis is on how to mitigate claims from arising. The perfect, well-scoped, defined responsibilities and risk allocated contract will entail lesser disputes. The project players can do their best with timely and fast communication toward resolution of disputes. There are several general principles of practice described in this section for mitigating claims that, when followed, can work toward the elimination of the basis for, or at least minimise, the occurring of claims.

The required Inputs to the Claim Mitigation process are:

- **The project plan:** The fundamental parts of the plan are the most important. A clear and carefully described scope of work, a reasonable schedule and an appropriate methodology of project execution tailored to the type of project and the degree of risk involved all go a long way to the goal of mitigating claims.

- **Contract terms:** Contract terms that provide logical sharing of risk for possible changes and unknown site conditions, force majeure type delays, periodic reporting, fair notice provisions and approval times also provide a basis for minimising claims.

- **Risk management plan:** Claims are mitigated by the use of a risk management plan that allocates the risk between the parties on the basis of which one has the most control over the risk involved. A contemporary owner's practice of often trying to have the contractor be responsible for more and more risk, some of which the contractor has little or no control over, is an invitation to claims.

- **Handling of Disputes:** Mishandling of disputes mostly leads to strained relationship of parties, delays in work and eventually to a claim.

- **Decision Making Process:** Cumbersome decision-making process or indecision leads to delays in work, dispute, and claim.

Tools and Techniques that help Claim Mitigation are:

- **Clarity of Language:** The contract scope and specifications are written in clear and unambiguous language.

- **Work Schedule:** The work schedule requirements are clearly stated and developed realistically for accomplishment and schedule update requirements are fair.

- **Request for information (RFI) procedure:** Contracts requiring designer or owner approval of drawings, materials of construction need a specific time bound clause for the answer required.

- **Effective Communication:** Efficient and effective communication is the key for bonding to reach common goals.

- **Prequalification Process:** Prequalification of contractors helps to find the seasoned and qualified contractors who are conscious for reputation in market. They avoid claim situations for sake of a claim activity.
• **Dispute Review Board (DRB):** Larger projects need a DRB, which acts as a kind of arbitration panel over any dispute arise during the progress. The potential claims are turned into changes or are dismissed for good reason.

• **Joint Recognition of Changes:** Both parties need to be realistic and carry a win/win approach. The best way of reducing claim potential is for the other party to recognise when a change has occurred. The tendency to fail to do this and argue incessantly over every potential change is a major factor in perpetuating claims.

• **Documentation:** Good documentation leads quickly to recognising a change and help reduce the prolonged argument between the parties. It also provides a good defence against claims.

Outcomes achieved from Claim Mitigation are:

• **Changes:** Potential claims for compensation or requests for extensions of time, or both, that are agreed are turned into changes and the claim/dispute disappear.

• **Enhanced Business Relations:** Parties have improved relations to go extra mile together.

• **Project Goals:** Successfully achieved the project goals.

### 11.4.4. Claim Pursuance

Natural eventualities may arise when Claim Pursuance becomes necessary. In a contract, no party is prepared to take extra financial or other burden for the default, omission and commission of other party or to bring additional benefits on cost. The process provides an approach to successfully pursue a claim in a contract. On construction projects, a number of such natural eventualities go to waste for improper approach that brings suffering to the party. The process has two major areas:

- Claim Identification
- Claim Quantification

#### 11.4.4.1. Claim Identification

The identification of a claim starts with sufficient knowledge of the scope and responsibilities stated in contract terms, when some activity appears to be a change in scope or terms requiring a contract adjustment. Proper identification involves not only an interpretation of what the contract requires, but also a documented description of the activity viewed as extra to that required by the contract.

The necessary inputs to Claim Identification are:

• **Contract scope:** The baseline scope of work as approved in the contract.

• **Contract terms:** The responsibility for work to perform, especial terms relating to changes, changed conditions, schedule preparation, submittal and notices given.

• **Extra work description:** Description of work believed to be extra to the contract, where and when it took place. Statement of why it is not covered in the contract scope and reference to the section of the contract that supports the contention.

• **Description of extra time requested:** Record of the extra work and delays. Time extension claims resulted due to events such as unusual weather, strikes or other force majeure items
outside the contractor's control may be valid while they may not be compensable. The contract and local law decisions often state which are compensable.

- **Hold-ups and Delays**: Record of hold-ups and delays caused by events beyond control of a party but responsible for management under the contract.

Tools and Techniques for Claim Identification:

- **Contract terms**: The provisions relating to changes and notice are time barred. In many cases, claims are invalid when not made timely.

- **Expert Judgment**: It is worthwhile to reach a consensus among more than one person that the activity under question does merit claim status. In some cases of more important or larger claims legal advice further support to the validity of the claim.

- **Documentation**: Most important factor is the need for good supportive documentation. This may take the form of photographs and videos of the work in question, relevant contract sections, drawings, relevant statements of persons involved in or related to the claimed work. In addition, the time for work that was performed is noted. It is helpful to open a new cost account to cover the claimed work in order to clearly separate it from other contract work.

The outcomes achieved from the Claim Identification process are:

- **Statement of claim**: The information is gathered to prepare a complete statement of the claim and why it is considered extra to the contract.

- **Documentation**: Presentation with supportive documentation for justification is made.

### 11.4.4.2. Claim Quantification

Once an activity has been reviewed and a decision made that it is worthy of pursuing as a claim the next step is to quantify it in terms (usually) of additional compensation or a time extension to the contract completion or other milestone date. Those who have had experience with this side of claim management know that it is not unusual for the claimant to inflate the amount of the claim to the extent possible and thus it later becomes a form of bargaining process between the parties as a reasonable “truth” is sought. Nevertheless, there are proper and logical ways of determining the cost of the extra activity or damages in terms of both money and time. The process uses a cause and effect approach to determine the full effect of the claimed activity—what was the full effect on the construction work caused by the claimed activity? Sometimes the claimed activity has an indirect effect on other aspects of the construction project making other work more costly, changing sequences, delaying other activities. To the extent that these indirect effects can be justified and quantified they are properly part of the total cost of the claim.

The necessary Inputs to Claim Quantification are:

- **Statement of claim**: The outcome of Claim Identification above.

- **Other Work Affected by claimed activity**: In the event that there is additional effect on the balance of the contract work caused by the claimed activity. These effects are treated in the same manner and data collected as for the claimed activity itself.

- **Loss of Profit**: Detail estimation or an Agreed basis for working out profits.
The Tools and techniques required for claim quantification:

- **Quantity measurement:** Develop actual quantities of the claimed item/work. When disagreement arises, the first place to look for agreement is the BOQ involved.

- **Cost estimation:** Develop costing of the resources involved in the claimed work. The cost records provide the basis of the estimate or prepare estimate using current applicable rates. Overhead cost and profit are proper as the claim is treated at this stage as a change. In case claimed work has an effect on other work of project that causes additional cost, it is estimated for cause and effect relationship.

- **Contract law precedents:** It is helpful to cite previous cases that act to support the claim in those more complex situations where the contract does not provide a solution. Such cases may give guidance as to what may or may not be included in the claim or how the claim may be evaluated.

- **Schedule analysis:** Compare the “as planned” schedule with the “as built” schedule to support the time extension requested not only for the claimed activity, but also for the effect (if any) on the balance of the project. Schedule analysis with the aid of today’s sophisticated computer programs can help, but also can make this analysis very complicated. The ultimate deciding factor is the effect on the critical path; it can become difficult to separate these because of all of the other factors that can and do affect construction schedules.

Outcomes achieved from Claim Quantification are:

- **Direct and indirect costs:** Statement of the cost or damages resulting from the claimed activity is developed with full support of the factors used in the calculation. Also, the cost, when justified, of the effects of the claimed activity on other aspects of the project calculated in the same manner as the direct costs.

- **Time extension:** The result from the schedule analysis

- **Documentation:** Backup of quantity calculations, time cards showing the extent of labour involved and machine usage, wage rates, equipment rates and invoices for material that are included in the claim are the kinds of documents needed for support of the quantification.
11.4.5. Claim Resolution

Even with all effort to prevent claims, they may still arise for a justifiable disagreement as to whether the claim in question is a change to the contract or not or whether the claimed amount of compensation or time requested is correct. When this situation arises there begins a step-by-step process to resolve these questions. It is axiomatic that the longer this process takes the more expensive and disruptive it is to both parties. Therefore, the goal is to settle these issues as soon and at the lowest point in the organisation as practicable. The process begins with negotiation, perhaps at more than one level, before moving on to mediation, arbitration and litigation depending on the remedies afforded by the contract. Because of the proliferation of claims in construction and the expense of litigation, alternate methods of resolution have been increasingly used. Called ADR for Alternate Dispute Resolution, they include mediation, arbitration and mini-trails.

Necessary Inputs to Claim Resolution are:

- **Statement of claim**: Established through identification
- **Claim quantification**: Established through quantification
- **Contract**: The agreed terms of contract that provides the ultimate baseline and means for resolution
- **Correspondence**: Record of correspondence on the matter is initiated at a relevant point in time.

Tools and Techniques for Claim Resolution:

- **Negotiation**: The foremost and best step for resolution. Sometimes the negotiation needs to be elevated to a higher level, but it still is a negotiation between parties trying to find an equable solution.
- **Alternate Disputes Resolution (ADR)**: These include mediation, arbitration and mini-trials.
- **Litigation**: The eventual result when all attempts have failed. Construction lawsuits are commonly complex for a jury to understand and often take a longer time to present. This is the “last resort” and more expensive in terms of cost and outcomes that may upset the organisations involved. Parties in litigation really need to ensure that this is the only way for resolution.
- **Cost Estimated for resolution**: When the initial attempts at negotiation fail it is prudent for each party to estimate the cost of carrying the dispute further. Mediators are costly (but can be cost effective) and some arbitration cases can approach the expense of litigation due to the amount of discovery involved. An estimate of these costs can help in deciding just how beneficial it is to pursue a claim.

Outputs from Claim Resolution

- **Claim resolved**: One way or the other.
- **Contract closed**: In cases where the contract cannot be closed because of a pending dispute, resolution of that dispute enables the contract to be closed.
Claim management processes come into play on a construction undertaking much earlier than the formulation of contracts and need closer attention. On-going processes may be carried out along with Contract Management to ensure the desired outcomes envisaged in the purpose of the endeavour. Billions of funds are wasted in mismanagement of the construction claims that lead to fatal-damages to parties or undertaking or both. The key is a win/win approach for success together.

12. Contract management and administration

The goal of public procurement is to award timely and cost-effective contracts to qualified contractors, suppliers and service providers for the provision of goods, works and services to support national and local government, and public services operations, in accordance with principles and procedures established in the public procurement rules.

The goal of contract management and administration is to monitor delivery under the contract to ensure that it achieves its original objectives and includes tracking and auditing of contract terms such as:

- pricing and discounts;
- timeliness of payments and or receipts;
- performance in delivering agreed service level or specification of goods and services; and amendments.
12.1. Importance of good contract management and administration

Good practice contract management and administration has the capacity to increase revenue opportunities, decrease costs and enhance service delivery. Importantly, as competencies of managers and the resources at their disposal increase, it is essential that they strengthen their efforts to make compliance central to strategic objectives. Contracts form the basis on which most projects are completed.

A contract is a legally binding agreement between one or more parties. All transactions are the result of a contract whether explicit or implied and in most cases contracts are written legal documents. Contracts usually consist of terms and conditions presented in legally binding language and terminology.

In the past contracts may have been viewed as simple agreements to protect the parties from worst case scenarios. More and more contracts are seen as vehicles for achieving value for money and fostering good relationships with partner and stakeholder organisations.

Contracts are often managed manually and by multiple managers without an enterprise wide approach. A multitude of rules and complex decision making can lead to inflexibility, poor planning, extended lead times and below par service delivery.

It is important to consider all transactions and record all types of contracts in use including those that may not have any formal written documentation. Once identified and classified the appropriate level of management intervention can be applied. In the private sector, executives are beginning to realise the potential savings and opportunities which can be achieved through examining contract management and implementing an enterprise wide approach. Documentation of recent improvements in this area in the private sector suggests that there are benefits to be gained by the public sector as well.

Good contract management:

- optimises delivery of large capital projects;
- specifies management techniques and processes for all types of contracts;
- encourages achievement of value for money and continuous improvement;
- identifies savings and additional revenue opportunities;
- enhances risk management;
- provides clear and complete records for audit; and
- encourages communication between all parties to contracts.

Failure to implement adequate contract management could result in:

- paying for goods and services which do not meet the standards set out in the contract;
- significantly higher costs;
• revenue collection delays;
• customer and supplier dissatisfaction;
• overcharges by suppliers or underpayments by buyers;
• erroneous payments;
• service delivery issues;
• missed savings opportunities;
• failed compliance with regulatory provisions;
• increased risk;
• complications associated with audits;
• accidental renewal of goods or services;
• no verification of timeliness and accuracy of payments, receipts or deliverables;
• no monitoring of use of discounts or rebates;
• no monitoring of contract management processes and mechanisms;
• no monitoring of supplier performance across contracts; and
• no enforcement for non-performance or violation of regulations or other terms and conditions.
12.2. Oversight of contract management and administration

Given the above importance and having regard to international good practice in contract management and administration, to facilitate appropriate oversight of contract management the executive authority/responsible official must take all reasonable steps to ensure that:

- contracts are properly enforced;
- contracts are classified according to the level of management intervention required;
- contracts are monitored appropriately according to their classification;
- a single person and or committee structure is responsible for driving institution wide contract management performance;
- roles for contract owners, contract managers and other advisors are clearly defined;
- appropriate delegations are in place to allow role players to carry out their responsibilities;
- clear procedures for handover from contract award to contract management are in place;
- contract management plans are implemented where appropriate, and focused on outputs and performance;
- contract management processes and procedures are aligned with organisation wide governance and risk management processes, and performance is reported through established governance channels;
- ongoing contract management training is provided during induction and regular refresher training;
- there is an annual review and adjustment of contract management policies, procedures and guidance with a view to continuous improvement in contract management;
- there is regular assessment and evaluation of the effectiveness and efficiency of contract management activities including an assessment of the costs of the contract management function; and
- policies and procedures are in place in terms of:
  - identification and classification of contracts;
  - recognition; measurement and disclosure of contracts;
  - planning and budgeting for contracts;
  - oversight of contract management;
  - resourcing contract management activities;
  - document and information management regarding contracts;
  - relationship management in terms of parties to contracts;
o performance management of contracts and parties to contracts;
o payment, collection, incentives and penalties; and
o risk management relating to contracts.

12.3. Governance structure

Governance arrangements will set out where accountability sits in the government institution. A governance process chart for contract management should be constructed with associated procedural documentation describing at least:

- composition, roles and responsibility of each unit or function and relation to the institution’s overall governance structure;
- where different types of decisions are made and the workflow sequence of decisions;
- relevant delegations required to enable decisions discussed above; and
- reporting mechanisms.

12.4. Contract management mechanisms

To ensure appropriate contract management takes place it is important to consider:

- people;
- processes; and
- systems.

The type and level of resources required for contract management will vary for different types of contracts. Different levels of skills and competencies will be required for different types of contracts. Some will require establishment of a contract management team while others will be managed by a single person.

Processes will be driven largely by competencies and systems in place. Some contracts will be tracked using specialised software systems while others will be managed with hard copy registers.
12.5. Human resources and competency levels

Contract managers, owners, and other team members must have appropriate skills and qualifications to carry out the contract management activities required for the classification of contracts they are dealing with.

Skills and qualifications must be accurately detailed in job descriptions, which should be reviewed regularly and ideally in conjunction with annual staff appraisals. Accurate job descriptions contribute towards ensuring duties are carried out properly by appropriately skilled staff.

Salaries must be appropriate for the duties being carried out and competency of staff must be suited to the duties. Inappropriate salaries can lead to lack of motivation, staff turnover and staff without the requisite competencies performing duties outside of their abilities.

Appropriate training and support must be provided to contract owners to assist in their dealings with the contract management team and other stakeholders. This should include training as part of new staff induction as well as annual refresher training. The training plan should also allow for follow up sessions with staff that appear to not be following procedures. Introduction of new systems and procedures may also feature on the annual training plan.

If project/contract managers are not involved during the tendering / contract award process, there must be a handover from staff involved with the tendering and award. Staff managing the bid and award process should have an understanding of the contract management requirements and the implications that awarding the contract will have on managing the contract/project over its life.
12.6. Roles in contract management

There are various roles which need to be considered for effective contract management to take place. The following items need to be considered:

- Contract owners
- Contract manager
- Finance
- Legal
- Executive Authority
- Risk Management/Internal Audit
- Audit committees
- Contract management systems

12.6.1. Contract owners

The contract owner is the person who is requesting the goods and services and is often a line manager. Contract owner’s need a good understanding of the contract and may call on specialist advice depending on the level of complexity of the contract. Ultimately the contract owner should be making judgments about whether deliverables have been achieved.

Contract owners will be involved in at least the following:

- specification development including deliverables for timing, quantity and quality;
- agreement of measurement mechanisms for the contract deliverables; and
- regular communication with contractor and assessment of performance.

12.6.2. Contract manager

A contract manager’s role is to ensure that:

- the legal contract correctly stipulates requirements in line with the contract owners request and the institution’s strategic objectives;
- the goods and services are delivered according to standards set out in the contract; and
- contract documentation and information is managed throughout the Contract Life Cycle.

As such, a range of abilities is required. In particular, the following skills should be considered:

- communication and negotiation at all levels. Ability to ensure excellent communication and where necessary to prevent and repair situations of poor communication;
- financial skills sufficient to be able to understand financial implications of contracts;
- change management skills to successfully manage changing relationships and contract modifications;
- analytical skills to ensure sufficient analysis and reporting of contract progress and judgement regarding escalation of issues;
risk management;

performance management; and

legal issues around contracts.

The contract manager may sometimes be the same as the contract owner. For example, for employee contracts, the Human Resources Manager will be the contract manager. In the case of major construction projects, a project manager will generally be appointed to perform the functions of contract manager.

12.6.3. Finance

Finance will provide advice on budgeting and assist with preparation of in-year and annual reports and in particular with amounts committed and accrued. The role of finance also includes payments and collections and usually the systems and processes for authorisation. Finance may also be contract owner and or contract manager for certain types of contracts such as financing instruments.

Financial support may include but is not limited to advice on the following:

- development and review of the financial model;
- calculation of payments including penalties, incentives and terminations;
- efficient processing of payments according to the contract; and
- indexation and price variations.

12.6.4. Legal

The legal division may perform the role of contract manager for many contracts due to their role in understanding and negotiating complex terms and conditions. In other cases, legal’s role may be to provide expert advice to the contract owner and manager.

In-house or outside specialist legal advisory services may be required, from time to time, to establish and manage contracts. Legal is normally called upon to develop general conditions of contract for the majority of circumstances and special conditions where required. They may also be called upon in the following circumstances:

- dispute resolution;
- implementation of variations;
- implementation of contract changes (contractor ownership, nominated sub-contractors etc.);
- contractor distress;
- refinancing;
- certification of deliverables;
- breach of contract, penalties and termination; and
- enforcement of indemnities, guarantees and contractual claims.
12.6.5. Executive Authority

Overall accountability for all contractual agreements entered into by the institution resides with the executive authority. Hence, they are required to have a general understanding of the contract classifications and associated exposure contained in the Contracts Inventory. They must ensure that a comprehensive delegations system is in place and that staff with delegated authority have the necessary skills and qualifications to carry out their tasks and provide appropriate and timely advice.

12.6.6. Risk Management / Internal Audit

Risk management should provide input into:

- risk management plan templates for each classification of contract;
- the risk management component of training plans; and
- the internal audit plan.

Internal audit should review existing contracts and contract management systems and processes as part of the audit plan.

12.6.7. Audit Committees

“The Audit Committee is an independent committee responsible for oversight of the Institution’s control, governance and risk management.”

Their role will include an independent assessment of the adequacy of contract management systems and processes in terms of control and risk management.
12.7. Classification of contracts

To facilitate good contract management it is useful to classify contracts or groups of contracts according to the level of management intervention required. Such a classification system should take into account:

- contract type or nature;
- strategic importance of the goods and services being purchased or sold;
- contract value;
- contract duration; and
- contract complexity.

Policies and procedures should then be established and implemented to deal with the management control requirements for each classification and contract type. Each contract and / or each group of contracts should be listed by classification in a Contracts Inventory.

Each contract owner should maintain an inventory listing of the contracts they are responsible for. It is recommended that each institution select the lowest level of management that may be designated as contract owners.

A simple Contracts Inventory system which provides for recording classifications will capture the information reflected in the bullet points below. For each contract, record the ID number, description, type, Rand value and duration in months. Give the contract a rating of High, Medium or Low for the perceived level of complexity and strategic importance. Using the available information, provide an overall classification of High, Medium or Low management intervention required.

- Contract ID
- Contract description
- Contract type
- Contract value
- Contract duration
- Perceived complexity (H/M/L)
- Perceived strategic importance (H/M/L)
- Overall level of management intervention required (H/M/L)

For the contracts requiring High and Medium levels of management intervention, assign a level of effort rating for each of the following:

- oversight;
- resources required (including people and systems);
• document and information management;
• relationship management;
• performance management;
• payment, collection, incentives and penalties; and
• risk management.

A 5 point level of effort rating is recommended as follows.

<table>
<thead>
<tr>
<th>1= no effort</th>
<th>2= limited effort</th>
</tr>
</thead>
<tbody>
<tr>
<td>3= moderate effort</td>
<td>4= considerable effort</td>
</tr>
<tr>
<td>5= very high effort</td>
<td></td>
</tr>
</tbody>
</table>
12.8. Contract Life Cycle

The contract life cycle of a contract includes the stages shown in the diagram below:

- Planning
- Creation
- Collaboration
- Execution
- Administration
- Closeout / Renewal

12.8.1. Planning

The planning stage refers to planning and budgeting activities. During this time, strategic objectives are converted into approved budgets and operational plans. Budgets and operational plans will have sufficient detail to identify the need for contracts to carry out the approved operations.

Institutions must incorporate processes into their planning and budgeting to identify the need for contract creation and thus plan for when contract creation should take place to ensure delivery can occur as approved in the budget.

EXAMPLE:

An entity manages many of its contracts and will not create a contract unless the activities encompassed in the contract are contained in an approved business plan.

12.8.2. Creation

During creation, the contract author will decide on the most appropriate wording to give effect to the intended outputs and outcomes.

This step involves preparing the first draft of the contract documentation.

12.8.3. Collaboration

Collaboration is the drafting and negotiating process which includes internal and external reviews to ensure that the contract will give legal effect to the requirements of all parties to the contract. Internal review may include, but is not limited to, review by the following stakeholders:

- legal;
• finance;
• risk management;
• audit; and
• insurance.

External review will include one or more rounds of negotiation to arrive at a mutually agreeable set of terms and conditions that give effect to the requirements of all parties.

12.8.4. Execution

Execution is the act of signing the contract, making it legally enforceable and formalising the terms and conditions agreed to.

12.8.5. Administration

The goal of contract administration is to monitor delivery under the contract to ensure that it achieves its original objectives and includes tracking and auditing of contract terms such as:

• pricing and discounts;
• timeliness of payments and or receipts;
• performance in delivering agreed service level or specification of goods and services; and
• amendments.

NOTE:

While some institutions seem to have reasonably advanced systems in place for planning, creation and execution, they appear to be lacking in administration and closeout, and in particular, monitoring and evaluation of performance.

12.8.6. Closeout/Post-implementation review

Contract closeout is a very important stage and one that often receives the least amount of attention. This is intrinsically linked to the equivalent of a project implementation review done for projects.

Regardless of whether a contract is being closed or renewed, a review process should be undertaken to various levels of detail depending on the classification of the contract.

This review will focus on performance under the contract and consider at least the following:

• actual quantities, prices, total values vs. budgeted quantities, prices, total values;
• actual timeliness of delivery under the contract vs. contracted timeframes;
• actual service levels or specifications of goods and services vs. those contracted;
• review of procurement or sales methods;
• future budgets;
• change supplier, buyer or other stakeholder;
• outsourcing opportunities; and
• risk strategies.
12.9. Document and information management

Document and information management is concerned with managing the actual contract documentation as well as the information contained in those documents throughout the Contract Life Cycle. Information contained within contract documents includes milestones, deliverables, and payment or revenue billing schedules. These serve as the basis for the terms and conditions which projects are managed.

Management processes and procedures for document and information management will vary according to the requirements for the category of contract.

Manual and or computerised systems must be in place to ensure secure storage of and easy access to all contract documentation and the information contained in those documents. It is important to note that not all documentation will necessarily be stored in the same file or computerised system. However, ideally and given available resources, there would be a single enterprise contract management software solution capturing most contracts.

Contract documentation must be identified for each contract and may include but is not limited to:

- specification;
- request for proposals and requests for tenders;
- advertisement;
- bids and bid correspondence;
- selection and award process and results;
- contract;
- quote;
- order;
- delivery and acceptance / authorisation documentation; and
- payment documentation (invoices and authorisations).
12.9.1. Record Keeping

Obviously, the extent of record keeping required for a particular construction job will depend on the type of contract. However, some record keeping will be required in any case because it is:

1. Required by law
2. Required by the terms of the contract
3. Needed to control the on-going work
4. Needed as data for estimating future work
5. Needed for preserving the contractor’s rights under the contract

The first item may be ascertained by referring to the authorities having jurisdiction over the place of the work. The second may be determined by a thorough reading of the contract documents, both in terms of the administrative requirements contained in the general and special conditions, and the technical requirements contained in the specifications. The third, fourth and fifth items are for the contractor to decide, and depend largely on his disposition.

Perhaps the best case that can be made is that, if the contractor wishes to remain profitable he must maintain control of his on-going work, and control of on-going work requires on-going records. Some records may need to be kept daily, others weekly, and still others monthly.

12.9.2. A Typical Set of Records

A good set of records that might be kept on a fair sized construction project could well include the following files. Note that these files are assembled into blocks of like subject matter. This approach greatly facilitates ease of filing and subsequent recall. This list may seem like a lot of files and records, but most of them are kept by a well-organised project manager:

- Original Contract Tender Documents
- Issued for Construction set, and all subsequent revisions
- Instructions to contractor
- Contemplated Change Notices issued by the owner, Change Estimates, and Change Orders received
- Sub-contractor quotes, contracts, purchase orders and correspondence
- Drawings, originals, all revisions and re-submissions
- Drawing transmittals, and transmittals log
- Daily time records
- Daily equipment use
- Daily production logs, e.g. concrete pours etc.
- Material Delivery and Use Records, including expediting
• Accounting records: Pay roll, accounts payable and receivable, etc.
• Progress Payment Billings under the contract
• Daily Force Account Records, pricing and billings
• Contract Milestone Schedule or Master Schedule
• Short Term Schedules and up-dates
• Task schedules and analyses
• Original tender estimate
• Construction control budget
• Actual Cost Reports, weekly or monthly, including Exception Reports.
• Forecast-to-Complete Estimate up-dates
• Productivity Reports/Analyses
• Inter-office correspondence, including memos and faxes (all filed by topic).
• Contract correspondence
• Minutes of Contractual Meetings
• Minutes of Site Coordination Meetings
• Requests for information
• Notice of claims for delays and/or extra cost by contractor
• Government Inspection Reports
• Consultant Inspection Reports
• Accident Reports
• Daily diary or journal entries
• Notes of telephone conversations
• Progress Reports, weekly, monthly or quarterly
• Progress photographs
• Any other reports, such as special consultant reports
• A Filing Record of all the Record Files that are being maintained
12.9.3. Managing the Records

As well as managing the files, the records themselves also need managing. Some simple rules can help as follows:

1. Determine what records are to be kept, and how. Establish logs of the records, so that they can be found, referred to and/or followed up as required. Well-organised contractors establish standard reference lists and coding for all their contracts. This greatly facilitates managing, analysing and comparing contracts.

2. Once the records have been identified, ensure that they are in fact set up, maintained and used for managing the job.

3. Review the record keeping system from time to time, because records have a habit of growing in unexpected ways - like half the correspondence showing up under Miscellaneous, and the other half under General. In addition, some records may become obsolete or redundant, and should be discontinued. Unnecessary record keeping can waste a lot of time and money.

4. Records also take up space and equipment. Determine the useful life of the different components, and take a systematic approach to record disposal.

5. Take steps to ensure accuracy, reliability and hence credibility. Unreliable records can be quite useless, as well as a waste of money, and possibly even detrimental.

12.9.4. Change management

Procedures and systems need to be in place to manage changes to contract documentation and information due to changes in circumstances and subject to mutual consent. The contract itself should specify change control procedures and the circumstances under which they can be utilised.

Change control procedures include but are not limited to:

- circumstances under which a contract may and may not be changed;
- process for affecting change including authorisation;
- roles and responsibilities of all parties in the change control process; and
- impact of the change on all parties.
12.10. Enterprise contract management (ECM)

Enterprise contract management (ECM) involves managing every contract in the institution throughout the Contract Life Cycle with a view to maximising value for money through:

- identifying and maximising opportunities;
- maximising revenue;
- minimising costs through efficient operations;
- minimising risk;
- ensuring compliance with policies, procedures regulations and terms and conditions; and
- monitoring and evaluating performance of parties to the contract.

Types of contracts include but are not limited to:

- purchasing agreements;
- sales agreements;
- service agreements (external and internal);
- insurance policies;
- warranties;
- loans;
- leases;
- non-disclosure agreements; and
- collaboration agreements.

Different types of contracts will require more management intervention than others.

Systems (manual or computerised) are necessary to ensure proper management control and monitoring of contracts. In a situation with unlimited resources, every contract in an institution would be recorded on a single ECM software solution. Workflow processes would be automated and alert reporting and other regular reporting would be generated by pre-determined parameters.

Given the level of savings that could be generated, and the ability for such systems to focus contracted activities towards strategic objectives, all government institutions should be planning to move towards this level of enterprise contract management.

In addition to managing the documentation itself, the information contained in the documentation must be managed. Contract management information systems range from simple spreadsheets through to comprehensive ECM software solutions. It is critical to document all current systems and processes and embark on a systematic progression towards improving processes and implementing an ECM solution.
In very recent times there has been increased interest in automation of contract management processes. ECM solutions focus on contract life cycle management. The objective is to automate and streamline all aspects of contract management throughout the life of the contract. They do this through introducing and enabling:

- consistent and efficient contracting processes and controls;
- clear identification of risks and opportunities in the context of the institution’s enterprise risk management and governance structures;
- compliance with regulatory requirements; and
- compliance with financial accountability requirements.

ECM solutions may provide functionality including but not limited to:

- document management, workflow, audit trails and version control;
- contract authoring and configuration including wizards with templates for modification;
- contract collaboration workflow;
- resource planning functionality to plan tasks and track actual resources used;
- management of and reporting on performance with regard to terms and conditions; and
- integration or interfacing with other key systems.

Government institutions with a multitude of contracts ranging from standard to complex stand to gain significantly from the implementation of an ECM solution. Furthermore, in government there are substantial benefits to be gained by implementing a standardised system across multiple institutions. This would provide significant benefits around treatment of like contracts and may also assist in developing intelligence on suppliers and contracts for like goods and services.

Benefits of ECM solutions may include but are not limited to:

- reduction of goods and services costs;
- reduction of process cycle time – freeing up time to spend on value add activities; and
- decreased risk and increased opportunities.

An ECM solution provides a link between:

- supplier relationship management;
- procurement;
- customer relationship management;
- sales and distribution;
- accounts receivable and accounts payable; and
• planning and budgeting.

12.10.1.  Enhanced visibility

By identifying, classifying and recording information about contracts in a standard way, an ECM solution increases visibility of contract objectives and conditions, enhancing decision making. For example, it may become clear that several contracts are in use for the same goods and services. Efficiencies could be achieved through consolidation, leading to contract management savings, and the opportunity to negotiate better prices. A proactive approach to management is facilitated as decision makers are alerted to upcoming key trigger points and breaches in terms and conditions. Preventative and remedial action can be initiated earlier leading to reduction of overall risk and ultimately interventions which successfully avoid more serious breaches.

12.10.2.  Reducing costs and increasing revenue

Contract consolidation can lead to cost savings through reducing contract management workload as well as through negotiation of better prices.

Notification of renewal dates and other key trigger points, including automatic renewals and deviations from agreed terms and deliverables, can amongst other things:

• reduce the risk of overpayment;
• reduce payment of penalties;
• reduce acceptance of goods and services outside of specifications; and
• ensure that non-performing contractors are coached to performance or replaced.

Appropriately implemented ECM systems can reduce the cost of internal and external audits and reduce the risk of penalties for non-compliance with legislation and regulatory frameworks.

Appropriate automation of contract authoring and collaboration lessens the administrative burden and frees up parties to concentrate on negotiating better contracts. Resources can be diverted to value added tasks. For example, the legal team may be released to review more complex issues in contracts.

Document management functionality can provide for a “single active version” where older versions are archived and access and action is restricted based on authority. Automation of policies and procedures regarding document retention, access and disposal further ensures appropriate document protection and access.

Paper versions of contracts can be reduced with a significant amount of work carried out on electronic versions. Workflow functionality maintains version control and tracks the person who made each particular change to the contract. Storage of contracts in multiple locations, lost and duplicate contracts can be reduced.
Linking key trigger dates in the contract document and contract management process to electronic calendars and reminders can provide powerful alert reports for contract owners, managers and other stakeholders.

On the sales side, automated alerts can:

- potentially facilitate timely and accurate invoicing for accounts receivable;
- ensure follow ups are performed to minimise outstanding debtors; and
- ensure collection of penalties and interest due.

12.10.3. Compliance with regulations and procedures

As mentioned in the above section, ECM systems can reduce the cost of internal and external audits and reduce the risk of penalties for non-compliance with legislation and regulatory frameworks.

Solutions for ECM can use standard templates for contract clauses, alerts and regular reports. Internal policy and procedure requirements as well as requirements for compliance with external regulatory frameworks can be built into these templates.

In addition to allowing quicker contract drafting and ensuring timely regular reporting and alerts by exception, an ECM can encompass the relevant internal and external rules and facilitate uniform and comprehensive compliance. In addition to managing the documentation itself, the information contained in the documentation must be managed.

Contract management information systems range from simple spreadsheets through to comprehensive enterprise contract management (ECM) software solutions. It is critical to document all current systems and processes and embark on a systematic progression towards improving processes and implementing an ECM solution.
12.11. **Contract management checklist**

12.11.1. **Contract Planning**

- Strategic planning and budgeting processes provide for review of contracts
  - Existing contracts continuing through or concluding during the budget year
  - Proposed contracts commencing in the budget year
  - Advance planning for contracts required in future years

- Operational plans developed at budget time specify contracting requirements
  - Suppliers, buyers, stakeholders identified – refer to relationship management framework
  - Time frames specified for
    - Creation
    - Collaboration
    - Execution and commencement
    - Reviews
    - Closeout / renewal
  - Objectives of each contract linked to strategic objectives of the institution
  - Communication to relevant internal and external stakeholders regarding contracting requirements
  - Link to annual procurement plan on the purchasing side
  - Link to annual sales and distribution plan on the sales side

- Strategic planning and budgeting processes provide for review of contract management function
  - Issues identified during year and from AFS and Annual Report
  - Contract management policies and procedures
    - Identification and classification
    - Recognition, measurement and disclosure
    - Planning budgeting and reporting
    - Oversight
    - Resourcing contract management
- Document and information management
- Relationship management
- Performance management
- Payment, collection, incentives and penalties
- Risk management
12.11.2. **Contract Creation**

- Contract ID assigned
- Contract classification for management purposes
- Budget, implementation and in-year monitoring structures in place
- Contract oversight structures in place
  - Supplier / buyer / stakeholder induction completed
  - Contract manager appointed
  - Steering group and other advisory and oversight structures in place
  - Handover from bid and award stage to contract management
  - Contract management plan in place
- Contract management resources appropriate for classification
- Contract documentation systems in place
  - Original signed hard copy contract on file
  - Electronic copy of original signed contract on file (PDF)
  - Key information and trigger points recorded in the contract management system
- Appropriate supplier relationship structures in place
  - Roles and responsibilities of supplier, contract owner, and contract manager defined
  - Formal and informal communication channels clear
  - Conflict resolution mechanisms and escalation routes identified
  - Regular meeting dates set (monthly / quarterly / annually)
- Performance management systems in place
  - Performance management processes and metrics agreed with stakeholders prior to contract commencement
  - Performance measurement metrics consistent with institution’s strategic objectives
  - Performance reviews set (monthly / quarterly / annually) and documentation defined
- Payment, collection, incentive and penalty systems in place
  - Payment or collection processes and remedial action understood by all parties
- Incentive or penalty provisions linked to outcomes and strategic objectives of institution

- Risk management plan in place
  - Risk identification, and assessment completed
  - Potential risk response documented
  - Risk management plan is in line with institution wide Risk Management Plan
12.11.3. Contract Collaboration

- Parties for collaboration are appropriate
  - Contract owner
  - Legal
  - Finance
  - Risk management
  - Audit
  - Insurance
  - External parties to contract

- Timeframes for collaboration take into consideration operational deadlines for service delivery

- Version and change control is maintained in an efficient manner

- Delivery mechanisms are appropriate
12.11.4. Contract Execution

- Signing parties (including witnesses) are aware of timing and availability requirements well in advance
- Required collaboration is complete and execution is in line with agreed terms and conditions
- Legal requirements are in order
- Execution and final terms and conditions communicated to all relevant internal and external parties
  - Contract owner
  - Contract manager / administrator
  - External parties to contract
- Executed documents appropriately filed
12.11.5. Contract Administration

- Maintenance of Contracts Inventory
- Stakeholder ID (e.g. supplier or buyer ID and name)
- Contract ID, and description
- Contract value (total and annualised)
- Contract duration
- Classification for management purposes and appropriate management intervention required
  - Oversight
  - Resources
  - Document and information management
  - Relationship management
  - Performance management
  - Payment, collection, incentives and penalties
  - Risk management
- Stakeholders to receive reports
- Frequency of review and reporting
- Reporting requirements defined including documentation format and information content
  - Contracts likely to give rise to contingent assets or liabilities
  - Recently closed contracts
  - Recently renewed contracts
  - Impending contract commencement
  - Key trigger points
  - Tax clearance maintained and other statutory and compliance requirements
  - Risk management issues
  - Performance issues by exception (good and poor)
12.11.6. Contract Closeout or Project post-implementation review

- Contract ID, description and classification
- Contract closeout
  - Early termination
  - Normal termination
- Contract renew
  - Auto renew
  - Competitive process
  - Other
- Deliverables reviewed (actual vs budget)
  - Quantities
  - Prices
  - Total values
  - Timeliness of delivery
  - Service levels or specifications
- Performance review completed
  - Performance rating (1–5)
  - Value for money achieved (Y/N)
  - Considered for future contracts (Y/N)
- Relationship management framework informed
- Change supplier, buyer or other stakeholder
- Future budgets informed
- Risk management plan informed
13. Reference List


