Chapter 04

Project Integration Management

erga

Project Management

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Erga Academy

PM17 – PMP6 Certification

EPDM & ESM tracks

20 credits

Plan


1. Introduction
2. Project Life Cycle & Organization
3. The role of the Project Manager
4. Project Integration Management
5. Project Scope Management
6. Project Schedule Management
7. Project Cost Management
8. Project Quality Management
9. Project Resource Management
10. Project Communications Management
11. Project Risk Management
12. Project Procurement Management
13. Project Stakeholder Management
14. Professional Responsibility

Plan

- Chapter 04- Project Integration Management

Includes the processes and activities needed to identify, define, combine, unify and coordinate the various processes and project management activities within the Project Management Process Groups.

Plan

- **Chapter 04- Project Integration Management**
  - 4.1 Develop Project Charter
  - 4.2 Develop Project Management Plan
  - 4.3 Direct & Manage Project Work
  - 4.4 Manage Project knowledge
  - 4.5 Monitor & Control Project Work
  - 4.6 Perform Integrated Change Control
  - 4.7 Close Project or Phase

	Project Management Process Groups				
Knowledge Areas	Initiating	Planning	Executing	Monitoring & Controlling	Closing
4. **Project Integration Management**	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage work 4.4 Manage Project knowledge	4.5 Monitor & Control project work 4.6 Perform Integrated Change Control	4.7 Close Project or Phase

Plan

Chapter 04- Project Integration Management

- **4.1 Develop Project Charter** (Initiating): The process of developing a document that formally authorizes the existence of a project and provides the PM with the authority to apply organizational resources to project activities.
- **4.2 Develop Project Management Plan** (Planning): The process of defining, preparing, and coordinating all plan components and consolidating them into an integrated project management plan.
- **4.3 Direct and Manage Project Work** (Executing): The process of leading and performing the work defined in the project management plan and implementing approved changes to achieve the project's objectives.
- **4.4 Manage Project Knowledge** (Executing): The process of using existing knowledge and creating new knowledge to achieve the project's objectives and contribute to organizational learning.
- **4.5 Monitor and Control Project Work** (M&C): The process of tracking, reviewing, and reporting overall progress to meet the performance objectives defined in the project management plan.
- **4.6 Perform Integrated Change Control** (M&C): The process of reviewing all change requests; approving changes and managing changes to deliverables, organizational process assets, project documents, and the project management plan; and communicating the decisions.
- **4.7 Close Project or Phase** (Closing): The process of finalizing all activities for the project, phase, or contract.

Chapter 04- Project Integration Management

Project Integration Management is specific to PMs.

- Whereas other Knowledge Areas may be managed by specialists (cost analysis, scheduling specialists, risk management experts), the accountability of Project Integration Management cannot be delegated or transferred.
- The PM is the one who combines the results in all the other Knowledge Areas and has the overall view of the project. He is ultimately responsible for the project as a whole.

- Projects and project management are integrative by nature.

Chapter 04- Project Integration Management

Project Integration Management is about:

- Ensuring that the deliverable due dates of the product, service, or result; project life cycle; and the benefits management plan are aligned;
- Providing a project management plan (PMP) to achieve the project objectives;
- Ensuring the creation and the use of the appropriate knowledge to and from the project as necessary;
- Managing the performance and changes of the activities in the PMP;
- Making integrated decisions regarding key changes impacting the project;
- Measuring and monitoring the project's progress and taking appropriate action to meet project objectives;
- Collecting data on the results achieved, analyzing to obtain information, and communicating this information to relevant stakeholders;
- Completing all the work of the project and formally closing each phase, contract, and the project as a whole;
- Managing phase transitions when necessary.

Chapter 04- Project Integration Management

The Project Integration Management Knowledge Area requires combining the results from all the other Knowledge Areas. Evolving trends in integration processes include but are not limited to:

- **Use of automated tools.** The volume of data makes it necessary to use a project management information system (PMIS) and automated tools to collect, analyze, and use information to meet project objectives and realize project benefits.
- **Use of visual management tools**. Some project teams use visual management tools, rather than written plans and other documents, and empowers team members and other stakeholders to help identify and solve issues.
- **Project knowledge management**. The increasingly mobile and transitory work force requires a more rigorous process of identifying knowledge throughout the project life cycle and transferring it to the target audience so that the knowledge is not lost.
- **Expanding the project manager's responsibilities**
- **Hybrid methodologies**

Chapter 04- Project Integration Management

Considerations for tailoring include but are not limited to:

- **Project life cycle.** What is an appropriate project life cycle? What phases should comprise the project life cycle?
- **Development life cycle.** What development life cycle and approach are appropriate for the product, service, or result? Is a predictive or adaptive approach appropriate? If adaptive, should the product be developed incrementally or iteratively? Is a hybrid approach best?
- **Management approaches.** What management processes are most effective based on the organizational culture and the complexity of the project?
- **Knowledge management.** How will knowledge be managed in the project to foster a collaborative working environment?
- **Change.** How will change be managed in the project?
- **Governance.** What control boards, committees, and other stakeholders are part of the project? What are the project status reporting requirements?
- **Lessons learned.**
- **Benefits.** When and how should benefits be reported: at the end of the project or at the end of each iteration or phase?

Chapter 04- Project Integration Management

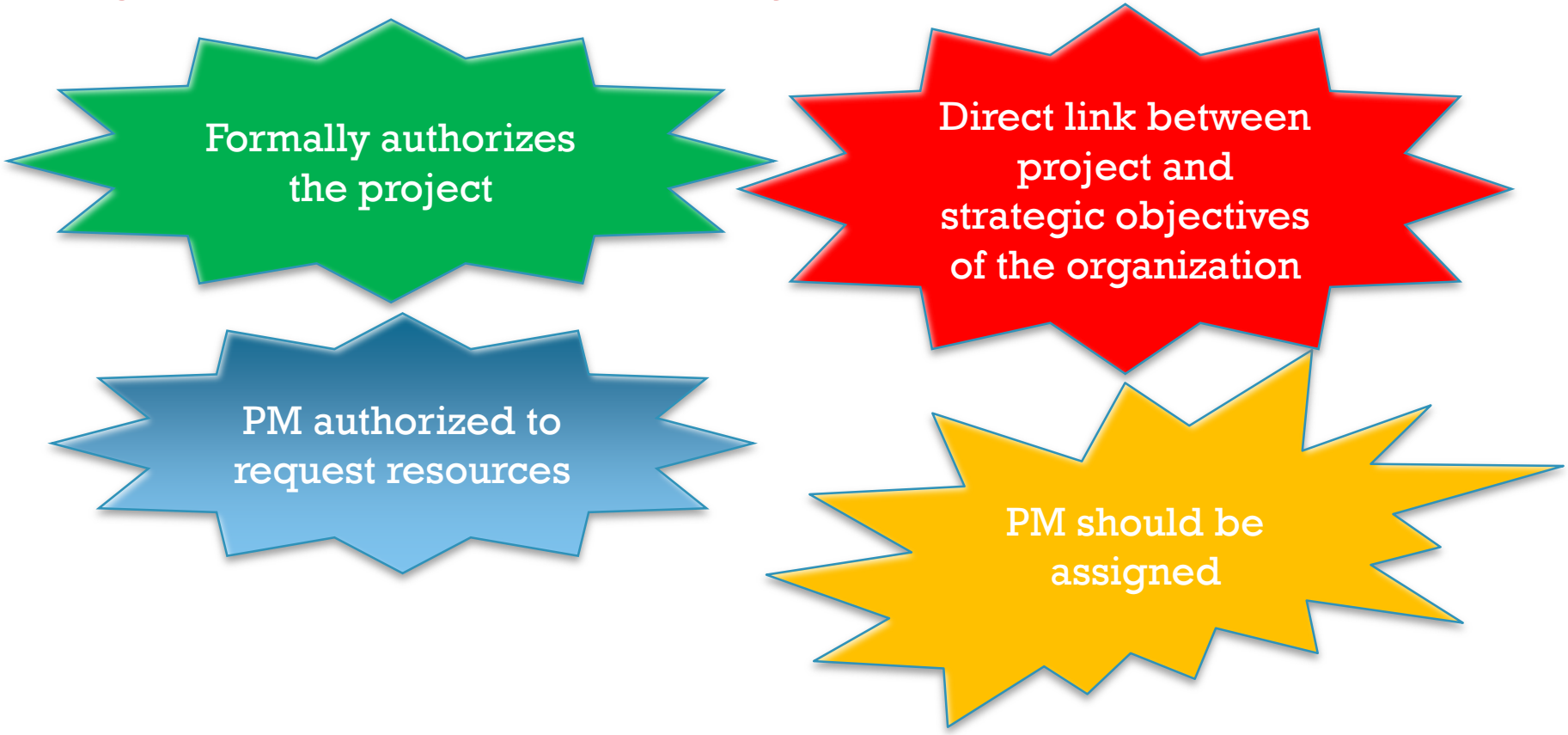
Iterative and agile approaches promote the engagement of team members as local domain experts in integration management.

- The team members determine how plans and components should integrate.
- The expectations of the PM as noted in the *Key Concepts for Integration Management* do not change in an adaptive environment, but control of the detailed product planning and delivery is delegated to the team.

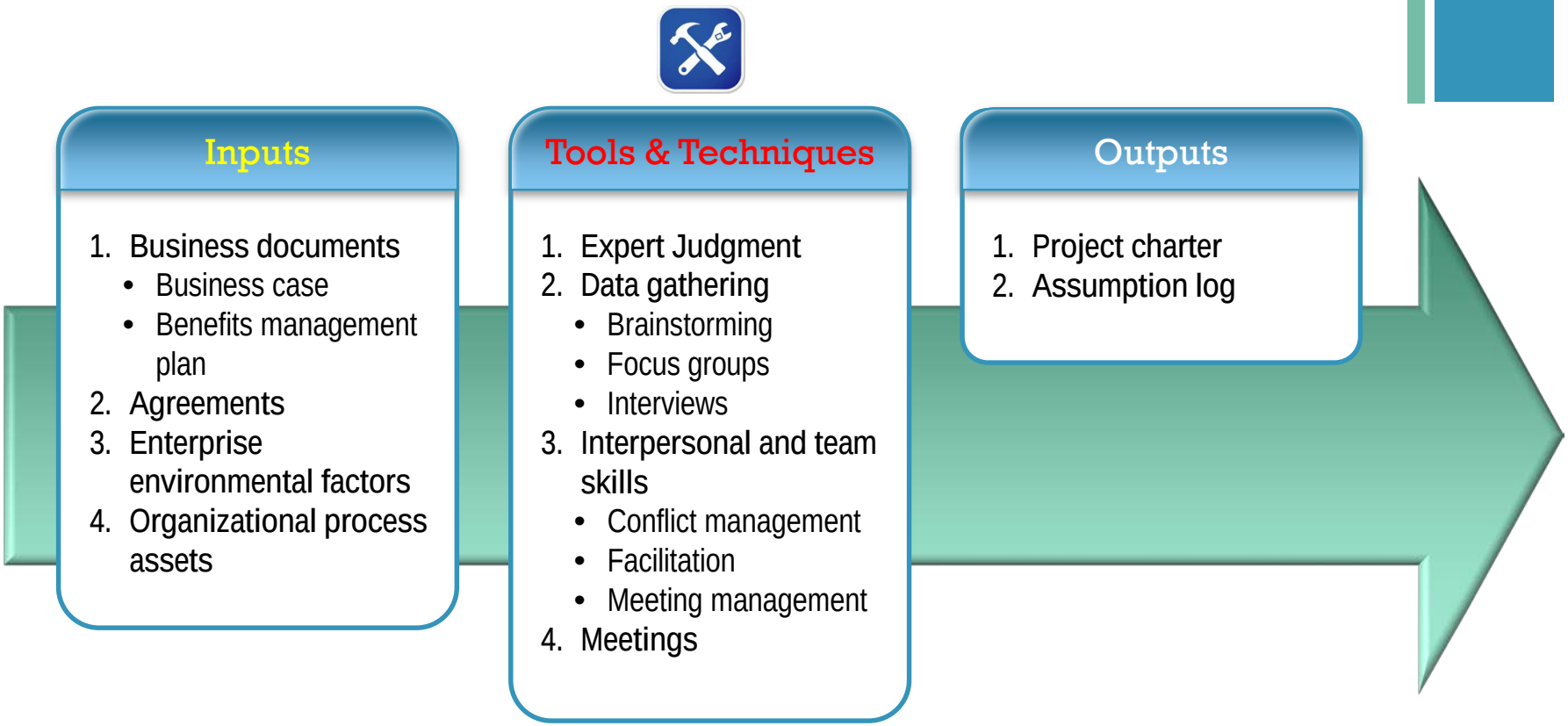
The PM's focus is on building a collaborative decision-making environment and ensuring the team has the ability to respond to changes. This collaborative approach can be further enhanced when team members possess a broad skill base rather than a narrow specialization.

4.1 Develop Project Charter

Developing a document that formally authorizes a project or a phase and provides the PM with the authority to apply organizational resources to the project activities.



4.1 Develop Project Charter



4.1 Develop Project Charter

1. Business Documents

The business case (Sec 1.2.6.1) and the benefits management plan (Sec 1.2.6.2) are sources of information about the project´s objectives and how the project will contribute to the business goals.

- Although the business documents are developed prior to the project, they are reviewed periodically.

- The approved business case, or similar, is most commonly used to create the project charter. The business case describes the necessary information from a business standpoint to determine whether the expected outcomes of the project justify the required investment.

4.1 Develop Project Charter

1. Business documents (cont'd)

The project charter incorporates the appropriate information for the project from the business documents.

The PM does not update or modify the business documents since they are not project documents; however, the PM may make recommendations.

2. Agreements

Agreements are used to define initial intentions for a project. It may be in the form of:

- Contracts,
- Memorandums of understanding (MOU),
- Service Level Agreement (SLA),
- Letter of agreement,
- letter of intent or any written agreement.

Typically, a "contract" is used when a project is performed for an external customer.

4.1 Develop Project Charter

3. Enterprise Environmental Factor

- Government or industry standards
- Legal and regulatory requirements and/or constraints.
- Marketplace conditions.
- Organizational culture and political climate.
- Organizational governance framework (a structured way to provide control, direction, and coordination through people, policies, and processes to meet organizational strategic and operational goals).
- Stakeholders' expectations and risk thresholds.

4. Organizational Process Assets

- Organizational standard policies, processes, and procedures.
- Portfolio, program, and project governance framework (governance functions and processes to provide guidance and decision making).
- Monitoring and reporting methods.
- Templates (project charter template).
- Historical information and lessons learned repository.

4.1 Develop Project Charter

1. Expert Judgment

The concept behind expert judgment is to rely on individuals, or groups of people, who have training, specialized knowledge, or skills in the areas you're assessing and is available from various sources, including:

- Organizational strategy;
- Benefits management;
- Technical knowledge of the industry and focus area of the project;
- Duration and budget estimation;
- Risk identification.

Such judgment and expertise is applied to any technical and management detail during this process

4.1 Develop Project Charter

Input → **Tools & Techniques** → Output

2. Data Gathering

This technique is useful to guide the development of the Project charter:

- **Brainstorming.** This technique is used to identify a list of ideas in a short period of time. It is conducted in a group environment and is led by a facilitator.

Brainstorming comprises two parts: idea generation and analysis. Brainstorming can be used to gather data and solutions or ideas from stakeholders, subject matter experts, and team members when developing the project charter.

- …

4.1 Develop Project Charter

Input → **Tools & Techniques** → Output

2. Data Gathering (Cont'd)

- **Focus groups.** (Sec 5.2.2.2). Focus groups bring together stakeholders and subject matter experts to learn about the perceived project risk, success criteria, and other topics in a more conversational way than a one-on one interview.

- **Interviews.** (Sec 5.2.2.2). Interviews are used to obtain information on high-level requirements, assumptions or constraints, approval criteria, and other information from stakeholders by talking directly to them.

4.1 Develop Project Charter

3. Interpersonal and Team Skills include:

- **Conflict management.** (Sec 9.5.2)
- **Facilitation.** ***Facilitation is the ability to effectively guide a group event to a successful decision, solution or conclusion***. A facilitator ensures that there is:
  - Effective participation,
  - Participants achieve a mutual understanding,
  - All contributions are considered,
  - Conclusions or results have full buy-in according to the decision process established for the project,
  - The actions and agreements achieved are appropriately dealt with afterward.
- **Meeting management.** (Sec 10.2.2.6) It includes preparing the agenda, ensuring that a representative for each key stakeholder group is invited, and preparing and sending the follow-up minutes and actions.

4.1 Develop Project Charter

Input → **Tools & Techniques** → Output

4. Meetings

For this process, meetings are held with key stakeholders to identify the project objectives, success criteria, key deliverables, high-level requirements, summary milestones, and other summary information.

4.1 Develop Project Charter

1. Project Charter

It documents the high-level information, such as:

- ✓ Project purpose;
- ✓ Measurable project objectives and related success criteria;
- ✓ High-level requirements;
- ✓ High-level project description, boundaries, and key deliverables;
- ✓ Overall project risk;
- ✓ Summary milestone schedule;
- ✓ Preapproved financial resources;
- ✓ Key stakeholder list.
- ✓ Project approval requirements (what constitutes project success, who decides the project is successful, and who signs off the project);
- ✓ Project exit criteria (what are the conditions to be met in order to close or to cancel the project or phase);
- ✓ Assigned project manager, responsibility, and authority level;
- ✓ Name and authority of the sponsor or other person(s) authorizing the project charter.

At a high level, the project charter ensures a common understanding by the stakeholders of the key deliverables, milestones, and the roles and responsibilities of everyone involved in the project.

4.1 Develop Project Charter

1. Project Charter (Basic template example)

[Project Name] Project Charter

Project Manager: [Name]

Sponsor: [Name]

Date: [mm/dd/yy]

This charter serves to announce the initiation of the [project name] project. We are undertaking this project [... Sales Training duration Revision ...].

[Project manager name] has been selected to lead this project.

Please provide your complete cooperation to the project and to [project manager name].

Thank you.

[This charter formally authorizes the project manager and is sent out from the sponsor or project selection board.]

4.1 Develop Project Charter

2. Assumption log

- High-level strategic and operational assumptions and constraints are normally identified in the business case before the project is initiated and will flow into the project charter.
- Lower-level activity and task assumptions are generated throughout the project such as defining technical specifications, estimates, the schedule, risks, etc. The assumption log is used to record all assumptions and constraints throughout the project life cycle.

4.2 Develop Project Management Plan

Defining, preparing, and coordinating all plan components and consolidating them into an integrated project management plan (PMP).

Basis of all work and How work will be performed

Comprehensive document

4.2 Develop Project Management Plan

The descriptions of the tools and techniques to be used for accomplishing those processes.

How the selected processes will be used to manage the specific project, including the dependencies and interactions among those processes, and the essential inputs and outputs.

how work will be executed to accomplish the project objectives.

How changes will be monitored and controlled.

4.2 Develop Project Management Plan

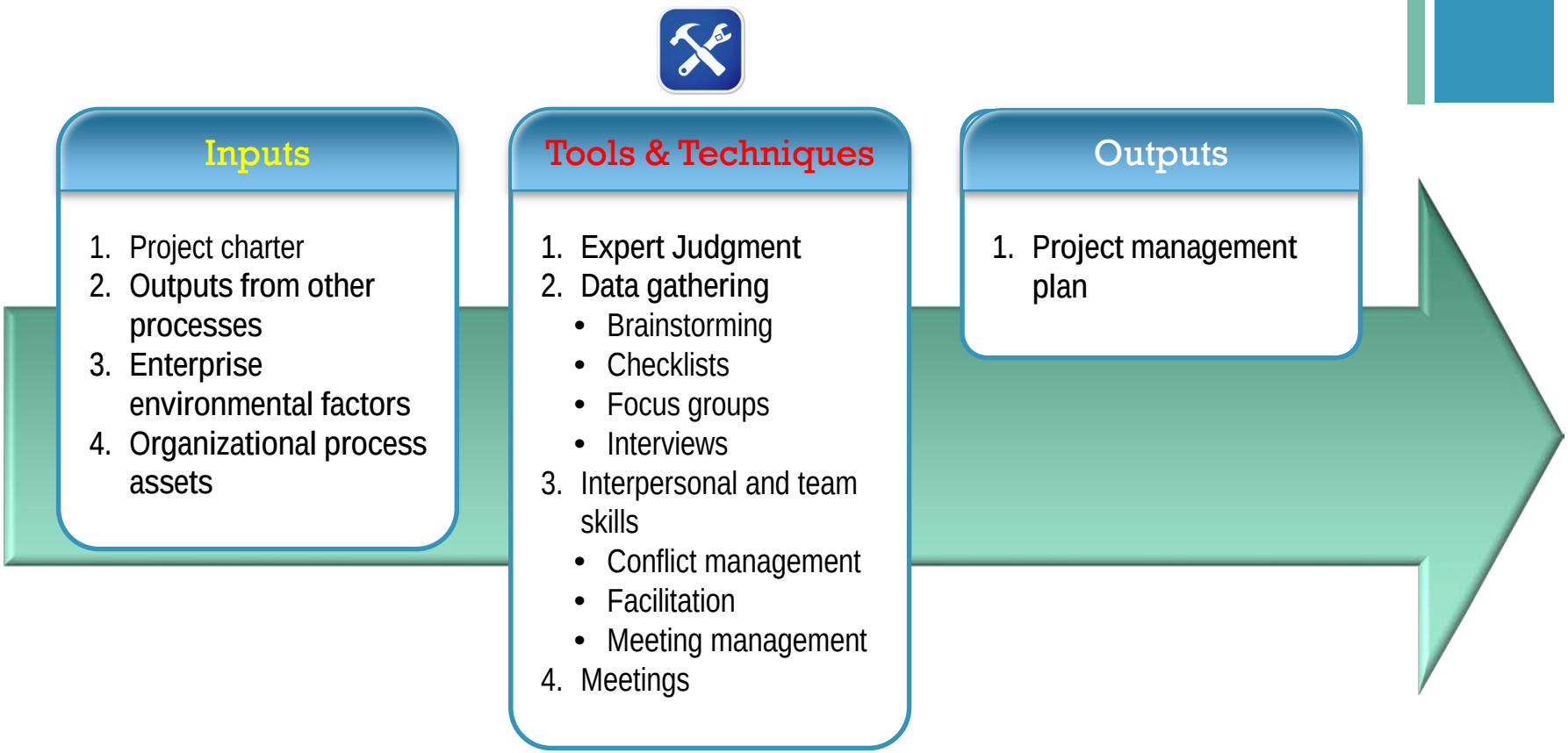
How integration of the performance measurement baselines will be maintained and used.

The need and techniques for communication among stakeholders.

The selected project life cycle and, for multiphase projects, the associated project phases.

How configuration management will be performed.

4.2 Develop Project Management Plan



4.2 Develop Project Management Plan

2. Output from other processes

Outputs from all the other planning processes described in chapters 5 to 13 are integrated to create the '*Project Management Plan (PMP)*'.

- Any baselines and subsidiary plans that are an output from other planning process are input to this process.
- In addition, changes to these documents may necessitate updates to the PMP.

4.2 Develop Project Management Plan

2. Outputs from other processes (cont'd)

- **Change management plan**
  - Change control system is a Sub-system of PMIS.
  - Process for submitting proposed changes.
  - Tracking systems for reviewing & approving proposed changes.
  - Defining approval levels for authorizing changes.
  - Provide method to validate changes.

- **Configuration management plan**
  - Sub-system of PMIS.
  - Standardized forms, reports, processes, procedures, and software to track and control evolution of project documentation.

4.2 Develop Project Management Plan

3. Enterprise Environmental factors

They include but are not limited to:

- Government or industry standards.
- Legal and regulatory requirements and/or constraints.
- Project management body of knowledge (PMBOK) for vertical market (construction) and/or focus area (environmental, safety, risk, or agile software development).
- Organizational structure, culture, management practices, and sustainability.
- Organizational governance framework (a structured way to provide control, direction, and coordination through people, policies, and processes to meet organizational strategic and operational goals)
- Infrastructure (existing facilities).

4.2 Develop Project Management Plan

4. Organizational Process Assets

They include but are not limited to:

- Organizational standard policies, processes, and procedures;
- PMP template, including:
  - Guidelines and criteria for tailoring the organization's set of standard processes to satisfy specific needs;
  - Project closure guidelines or requirements;
- Change control procedures, including the steps by which official organizational standards, policies, plans, procedures, or any project documents will be modified and how any changes will be approved and validated;
- Monitoring and reporting methods, risk control procedures, and communication requirements;
- Project information from previous similar projects;
- Historical information and lessons learned repository.

4.2 Develop Project Management Plan

1. Expert Judgment is utilized to:

- Tailor the process to meet the project needs.
- Develop technical and management details to be included in the PMP.
- Determine resources and skill levels needed to perform the project work.
- Define the level of configuration management to apply on the project.
- Determine which project documents will be subject to the formal change control process.
- Prioritizing the work on the project to ensure the project resources are allocated to the appropriate work at the appropriate time.

4.2 Develop Project Management Plan

2. Data Gathering

- Brainstorming.
- Checklists (Sec 11.2.2.2). Many organizations have standardized checklists available based in their own experience or use checklists from the industry. A checklist may guide the PM to develop the plan or may help to verify that all the required information is included in the PMP.
- Focus Groups.
- Interviews.

4.2 Develop Project Management Plan

How?

1. Project Management Plan content:

- ✓ Scope management plan
- ✓ Requirements management plan
- ✓ Schedule management plan
- ✓ Cost management plan
- ✓ Quality management plan
- ✓ Resource management plan
- ✓ Communications management plan
- ✓ Risk Management plan
- ✓ Procurement management plan
- ✓ Stakeholder engagement plan
- ✓ Configuration management plan
- ✓ Change management plan

(All Subsidiary plans)

What is my…?

- ✓ Scope baseline
- ✓ Schedule baseline
- ✓ Cost baseline
- ✓ Performance measurement baseline

Additional Components:

- ✓ Project life cycle description
- ✓ Development approach

4.2 Develop Project Management Plan

Difference between the PMP components and Project Documents

Project Management Plan	Project Documents	
Scope management plan	Activity attributes	Quality control measurements
Requirements management plan	Activity list	Quality metrics
Schedule management plan	Assumption log	Quality report
Cost management plan	Basis of estimates	Requirements documentation
Quality management plan	Change log	Requirements traceability matrix
Resource management plan	Cost estimates	Resource breakdown structure
Communications management plan	Cost forecasts	Resource calendars
Risk management plan	Duration estimates	Resource requirements
Procurement management plan	Issue log	Risk register
Stakeholder management plan	Lesson learned register	Risk report
Change management plan	Milestone list	Schedule data
Configuration management plan	Physical resource assignments	Schedule forecast
Scope baseline	Project calendars	Stakeholder register
Schedule baseline	Project communications	Team charter
Cost baseline	Project schedule	Test and evaluation documents
Performance measurement baseline	Project schedule network diagrams	
Project life cycle description	Project scope statement	
Development approach	Project team assignments	

4.2 Develop Project Management Plan

Additional components

Most components of the project management plan are produced as outputs from other processes, though some are produced during this process. Those components developed as part of this process will be dependent on the project; however, they often include but are not limited to:

- **Change management plan**. Describes how the change requests throughout the project will be formally authorized and incorporated.
- **Configuration management plan**. Describes how the information about the items of the project (and which items) will be recorded and updated so that the product, service, or result of the project remains consistent and/or operative.

4.2 Develop Project Management Plan

Additional components (cont'd)

- **Performance measurement baseline**. An integrated scope-schedule-cost plan for the project work against which project execution is compared to measure and manage performance.
- **Project life cycle**. Describes the series of phases that a project passes through from its initiation to its closure.
- **Development approach**. Describes the product, service, or result development approach, such as predictive, iterative, agile, or a hybrid model.
- **Management reviews**. Identifies the points in the project when the PM and relevant stakeholders will review the project progress to determine if performance is as expected, or if preventive or corrective actions are necessary.

4.2 Develop Project Management Plan

Glossary

Configuration management system: A subsystem of the overall project management system. It is a collection of formal documented procedures used to apply technical and administrative direction and surveillance to:

- identify and document the functional and physical characteristics of a product, result, service, or component;
- control any changes to such characteristics;
- record and report each change and its implementation status;
- and support the audit of the products, results, or components to verify conformance to requirements.

It includes the documentation, tracking systems, and defined approval levels necessary for authorizing and controlling changes.

Work Authorization: A permission and direction, typically written, to begin work on a specific schedule activity or work package or control account. It is a method for sanctioning project work to ensure that the work is done by the identified organization, at the right time, and in the proper sequence.

4.3 Direct and Manage Project Work

Leading and performing the work defined in the project management plan and approved Change requests (CR). Issue Change requests and implement approved ones.

- The process requires the PM and the PT to perform necessary actions to execute the PMP to accomplish the work defined in the project scope statement. Some of those actions are:
  - Perform activities to accomplish project objectives.
  - Expend effort and spend funds to accomplish the project objectives.
  - Staff, train, and manage the project team members assigned to the project.
  - The *work performance data* is collected and communicated to the applicable controlling processes for analysis.

4.3 Direct and Manage Project Work

Project execution involves managing and performing the work described in the PMP

Adapt approved changes into the project's scope, plans and environment

Establish and manage project communication channels, both external and internal to the PT

Collect project data and report cost, schedule, technical and quality progress, and status information to facilitate forecasting

(The majority of time and money is usually spent on execution)

Collect and document lessons learned, and implement approved process improvement activities.

4.3 Direct and Manage Project Work

Implement the plans, methods and standards

Create project deliverables

Manage risks and implement risk response activities

Obtain quotations, bids, offers or proposals if appropriate

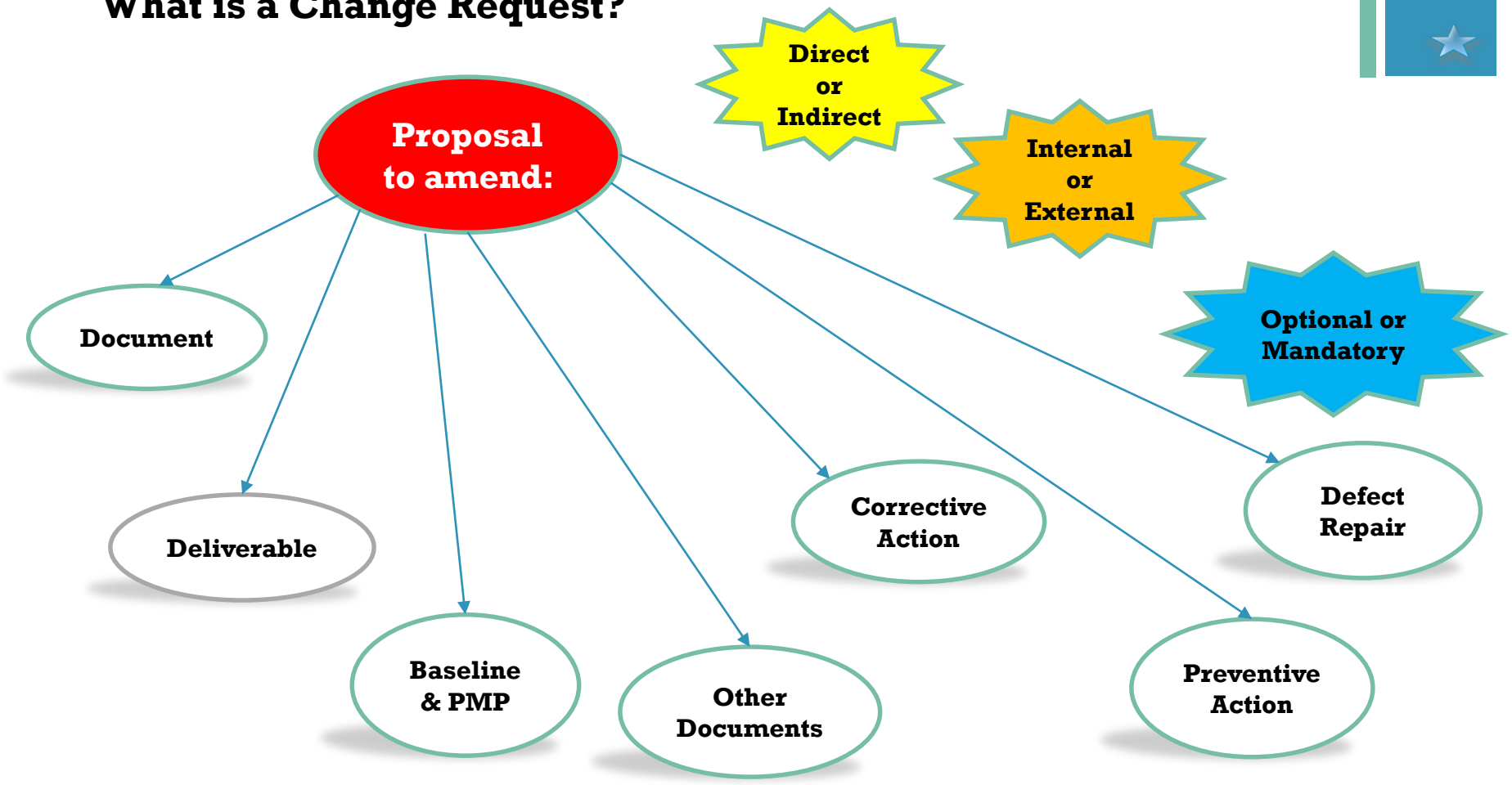
Conduct Procurements by choosing from among potential sellers

Manage sellers

Obtain, manage and use resources including materials, tools, equipment and facilities

4.3 Direct and Manage Project Work

What is a Change Request?



4.3 Direct and Manage Project Work

Inputs

1. Project management plan
2. Project documents
   - Change log
   - Lessons learned register
   - Milestone list
   - Project communications
   - Project schedule
   - Requirements traceability matrix
   - Risk register
   - Risk report
3. Approved change requests
4. Enterprise environmental factors
5. Organizational process assets

Tools & Techniques

1. Expert Judgment
2. Project management information system
3. Meetings

Outputs

1. Deliverables
2. Work performance data
3. Issue log
4. Change requests
5. PMP updates
6. Project documents updates
   - Activity list
   - Assumption log
   - Lessons learned register
   - Requirements documentation
   - Risk register
   - Stakeholder register
7. Organizational process updates

4.3 Direct and Manage Project Work

3. Approved Change Requests

Change requests which are approved as part of Integrated Change control process by the change control board (CCB).

- Approved Change requests may require implementation of preventive or corrective actions.
- They are scheduled and implemented by the PT and can impact any area of the project or PMP.

4.3 Direct and Manage Project Work

What is a Change Request?

Approved changes cover:

Corrective Action

Actions taken to re-align the project work.

You try to take action to correct the non-conformance event that happened in the past.

Preventive Action

Actions taken to ensure alignment of future work.

You take action to avoid or mitigate any potential non-conformance event that may occur in the future.

Defect Repair

Modify a non-conforming deliverable.

Updates

Modify policies, procedures, scope, cost schedule, budget, documents,…

4.3 Direct and Manage Project Work

2. Project Management Information System (PMIS)

The PMIS provides access to information technology (IT) software tools, such as:

- Scheduling software tools,
- Work authorization systems,
- Configuration management systems,
- Information collection,
- Distribution systems,
- as well as interfaces to other online automated systems such as corporate knowledge base repositories.

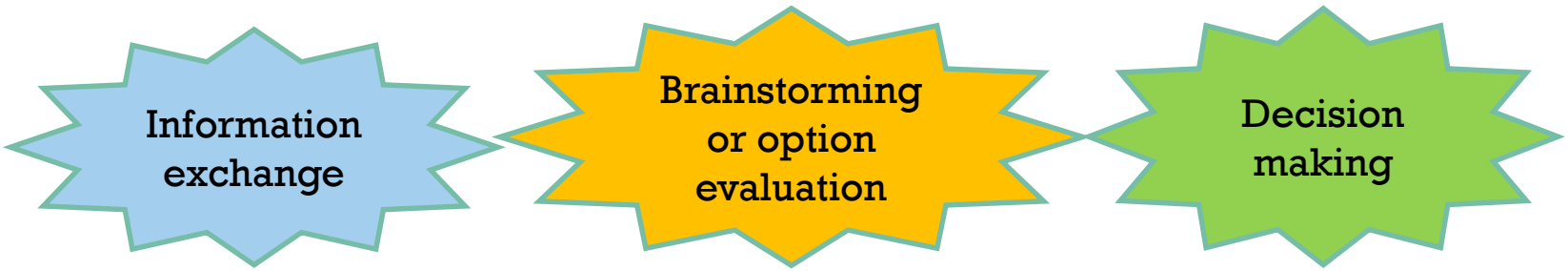
Automated gathering and reporting on key performance indicators (KPI) can be part of this system.

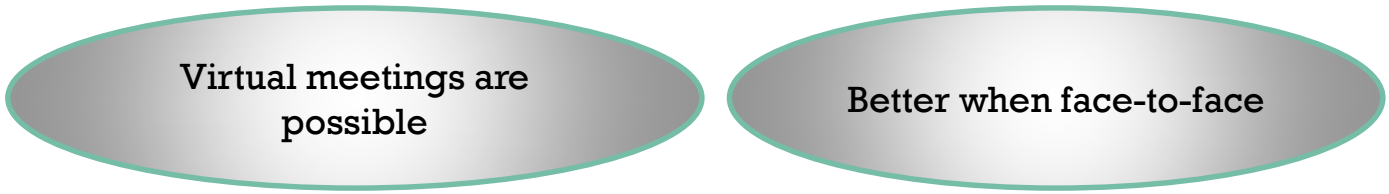
4.3 Direct and Manage Project Work

3. Meetings

Meetings are used to discuss specific topics when executing project work. They SHOULD be well prepared and documented.

- 3 types of meetings:





4.3 Direct and Manage Project Work

Input → **Tools & Techniques** → Output

3. Meetings (cont'd)

Example of using the "EVALUATION Matrix" tool during an **OPTION EVALUATION** technique:

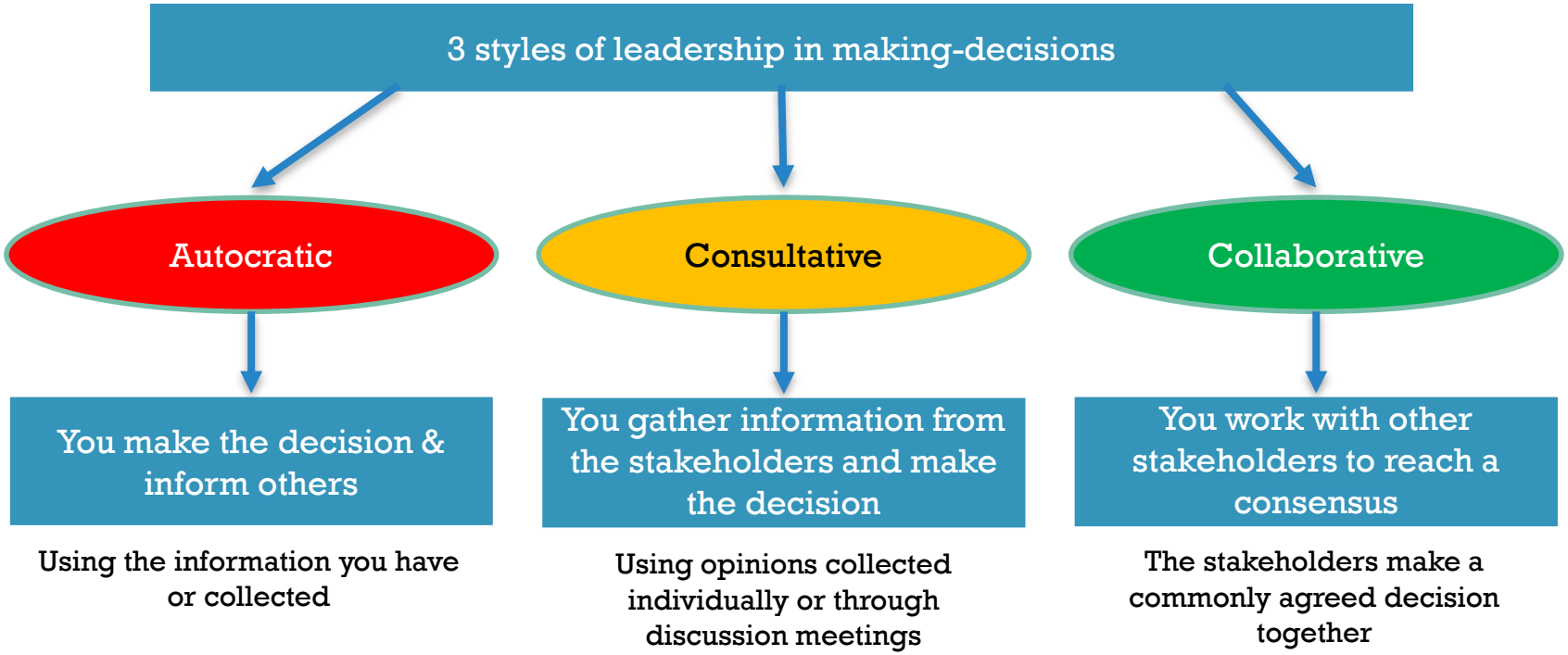
- The OPTIONS are those from what you want to make a choice
- Define the CRITERIA list from those that are most important to you in making the choice (use Brainstorming technique…)
- Decide on a ranking scale such as 1,2,3,4 and 5. 1 has the lowest desirability and 5 is the highest desirability.
- Score each option against the criteria list
- Make your analysis. One approach is to add the criteria scores for each option and to select the highest one in this example

Options	Short time to install	Low cost	Higher benefit	Skills availability	TOTAL
Option-1	1	3	3	4	11
Option-2	3	5	2	4	14
Option-3	3	5	4	4	16

4.3 Direct and Manage Project Work

3. Meetings (cont'd)

DECISION MAKING is an essential leadership skill… You should learn how to make timely, well-informed decisions to keep your leadership of your team…



4.3 Direct and Manage Project Work

1. Deliverables

A "deliverable" is any unique and verifiable product, result or service.

- Deliverables are required to be produced to complete a process, phase or project.
- Deliverables are tangible components completed to meet the project objectives and can include elements of the PMP.
- Change control should be applied once the first version of a deliverable has been completed. The control of the multiple versions or editions of a deliverable is supported by 'configuration management' tools and procedures.

4.3 Direct and Manage Project Work

2. Work Performance Data

Information on the status of the project activities being performed to accomplish the project work is routinely collected as part of the PMP execution. This information includes:

- Schedule progress showing status information.
- Deliverables that have been completed and those not completed.
- Schedule activities that have started and those that have been finished.
- Extent to which quality standards are being met.
- Key performance indicators (KPI).
- Number of change requests.
- Number of defects.
- Measurable percent completion of the scheduled activities.
- Resource utilization detail.

4.3 Direct and Manage Project Work

3.Issue Log

Throughout the life cycle of a project, the PM will normally face problems, gaps, inconsistencies, or conflicts that occur unexpectedly and that require some action so they do not impact the project performance. ***The issue log is a project document where all the issues are recorded and tracked***.

Data on issues may include:

- ✓ Issue type,
- ✓ Who raised the issue and when,
- ✓ Description,
- ✓ Priority,
- ✓ Who is assigned to the issue,
- ✓ Target resolution date,
- ✓ Status, and
- ✓ Final solution.

4.3 Direct and Manage Project Work

5. Project Management Plan Updates

Include, but are not limited to:

- Requirements management plan.
- Schedule management plan.
- Cost management plan.
- Quality management plan.
- Human resource management plan.
- Communication management plan.
- Risk management plan.
- Procurement management plan.
- Project Baselines.

4.4 Manage Project Knowledge

Using existing knowledge and creating new knowledge to achieve the project's objectives and contribute to organizational learning.

- The key benefits of this process are that:
  - Prior organizational knowledge is leveraged to produce or improve the project outcomes,
  - Knowledge created by the project is available to support organizational operations and future projects or phases.

4.4 Manage Project Knowledge

Explicit
(knowledge that can be readily codified using words, pictures and numbers)

Tacit
(knowledge that is personal and difficult to express such as beliefs, insights, experience and "know-how")

Knowledge management is concerned with managing both tacit and explicit knowledge for two purposes: reusing existing knowledge and creating new knowledge.

making sure the skills, experience, expertise of the team and other stakeholders are used before, during, and after the project

creating an atmosphere of trust so that people are motivated to share their knowledge

4.4 Manage Project Knowledge

Inputs

1. Project management plan
2. Project documents
   - Lessons learned register
   - Project team assignments
   - Resource breakdown structure
   - Source selection criteria
   - Stakeholder register
3. Deliverables
4. Enterprise environmental factors
5. Organizational process assets

Tools & Techniques

1. Expert Judgment
2. Knowledge management
3. Information management
4. Interpersonal and team skills
   - Active listening
   - Facilitation
   - Leadership
   - Networking
   - Political awareness

Outputs

1. Lessons learned register
2. PMP updates
3. Organizational process assets updates

4.4 Manage Project Knowledge

2. Project Documents

Project documents that can be considered as inputs include:

- Lessons learned register.
- Project team assignments.
- Resource breakdown structure.
- Source selection criteria
- Stakeholder register.

4. Enterprise Environmental factors

Include but are not limited to:

- Organizational, stakeholder, and customer culture.
- Geographic distribution of facilities and resources.
- Organizational knowledge experts.
- Legal and regulatory requirements and/or constraints. These include confidentiality of project information..

4.4 Manage Project Knowledge

5. Organizational Process Assets

Knowledge is often embedded in processes and routines:

- **Organizational standard policies, processes, and procedures.** Confidentiality and access to information; security and data protection; record retention policies; use of copyrighted information; destruction of classified information; format and maximum size of files; registry data and metadata; authorized technology and social media; etc.

- **Personnel administration.** Employee development and training records, and knowledge-sharing behaviors.

- **Organizational communication requirements.** Formal, rigid communication requirements are good for sharing information. Informal communication is more effective for creating new knowledge and integrating knowledge across diverse stakeholder groups.

- **Formal knowledge-sharing and information-sharing procedures.** Reviews before, during, and after projects and project phases; for example, identifying, capturing, and sharing lessons learned from the current project and other projects.

4.4 Manage Project Knowledge

2. Knowledge Management

It includes but are not limited to:

- Networking, including informal social interaction and online social networking. Online forums where people can ask open questions;
- Communities of practice (or of interest) and special interest groups;
- Meetings, including virtual meetings where participants can interact using communications technology;
- Work shadowing and reverse shadowing;
- Discussion forums such as focus groups;
- Knowledge-sharing events such as seminars and conferences;
- Workshops, including problem-solving sessions and learning reviews designed to identify lessons learned;
- Storytelling;
- Creativity and ideas management techniques;
- Knowledge fairs and cafés;
- Training that involves interaction between learners.

All of these can be applied face-to-face, virtually, or both.

4.4 Manage Project Knowledge

3. Information Management

Used to create and connect people to information. They are effective for sharing simple, unambiguous, codified explicit knowledge. They include but are not limited to:

- Methods for codifying explicit knowledge; for example, for producing lessons to be learned entries for the lessons learned register;
- Lessons learned register;
- Library services;
- Information gathering, for example, web searches and reading published articles;
- Project management information system (PMIS). it often includes document management systems.

4.4 Manage Project Knowledge

1. Lessons Learned Register

The ***lessons learned register*** can include the category and description of the situation. It may also include:

- ✓ Impact,
- ✓ recommendations,
- ✓ proposed actions associated with the situation,
- ✓ Challenges,
- ✓ Problems,
- ✓ Realized risks and opportunities,
- ✓ Other content as appropriate. ..

➢ Knowledge can be documented using videos, pictures, audios, or other suitable means that ensure the efficiency of the lessons captured.

➢ At the end of a project or phase, the information is transferred to an organizational process asset called a **lessons learned repository**.

4.4 Manage Project Knowledge

3. Organizational Process Assets Updates

All projects create new knowledge. Some of this knowledge is codified, embedded in deliverables, or embedded in improvements to processes and procedures as a result of the *Manage Project Knowledge* process.

- Existing knowledge can also be codified or embedded for the first time as a result of this process; for example, if an existing idea for a new procedure is piloted in the project and found to be successful.

- Any organizational process asset can be updated as a result of this process.

4.5 Monitor and Control Project Work

Tracking, reviewing, reporting and regulating the progress to meet the performance objectives defined in the project management plan.

- Monitoring includes collecting, measuring, and disseminating performance information, and assessing measurements and trends to affect process improvements.
- Take necessary actions to Control the project.
- Changes are inevitable on most projects, so it's important to develop and follow a process to monitor and control changes.
- Two important outputs of *monitoring and controlling project work* include recommended corrective and preventive actions.

Monitoring & Controlling is a continuous process, an aspect of Project management performed throughout the project

4.5 Monitor and Control Project Work

The process is concerned with:

- Comparing actual project performance against the baseline plan
- Assessing performance to determine whether any corrective or preventive actions are required, and then recommending those actions as necessary
- Analyzing, tracking, and monitoring project risks to make sure the risks are identified, their status is reported, and that appropriate risk response plans are being executed
- Maintaining an accurate, timely information base concerning the project's products and their associated documentation through project completion
- Providing information to support status reporting, progress measurement, and forecasting
- Monitoring implementation of approved changes when they occur.

4.5 Monitor and Control Project Work

Inputs

1. Project management plan
2. Project documents
   - Assumption log
   - Basis of estimates
   - Cost forecasts
   - Issue log
   - Lessons learned register
   - Milestone list
   - Quality reports
   - Risk register
   - Risk report
   - Schedule forecasts
3. Work performance information
4. Agreements
5. Enterprise environmental factors
6. Organizational process assets

Tools & Techniques

1. Expert Judgment
2. Data analysis
   - Alternatives analysis
   - Cost-benefit analysis
   - Earned value analysis
   - Root cause analysis
   - Trend analysis
   - Variance analysis
3. Decision making
4. Meetings

Outputs

1. Work performance reports
2. Change requests
3. PMP updates
4. Project documents updates
   - Cost forecasts
   - Issue log
   - Lessons learned register
   - Risk register
   - Schedule forecasts

4.5 Monitor and Control Project Work

3. Work Performance Information

It is the performance data collected from various controlling process. To become work performance information, the work performance data are compared with the PMP components, project documents, and other project variables. This comparison indicates how the project is performing.

- Examples: status of deliverables, implementation status of change requests etc.

4. Agreements

A procurement agreement includes terms and conditions, and may incorporate other items that the buyer specifies regarding what the seller is to perform or provide.

4.5 Monitor and Control Project Work

1. Expert Judgment

The PM in collaboration with the team, determines the actions required to ensure project performance meet the expectations

2. Data Analysis

Techniques that can be used include but are not limited to:

- **Alternatives analysis**,
  Alternatives analysis is used to select the corrective actions or a combination of corrective and preventive actions to implement when a deviation occurs.
- **Cost-Benefit analysis,**
- **Root cause analysis,**
- **Earned value analysis**,
- ***Variance analysis,***
- ***Trend analysis***

4.5 Monitor and Control Project Work

2. Data Analysis (cont'd)

❖ **Variance analysis**

Variance analysis reviews the differences (or variance) between planned and actual performance. This can include duration estimates, cost estimates, resources utilization, resources rates, technical performance, and other metrics.

- Variance analysis may be conducted in each Knowledge Area based on its particular variables. In *Monitor and Control Project Work*, the variance analysis reviews the variances from an integrated perspective considering cost, time, technical, and resource variances in relation to each other to get an overall view of variance on the project. This allows for the appropriate preventive or corrective actions to be initiated.

4.5 Monitor and Control Project Work

2. Data Analysis (cont'd)

❖ **Trend analysis**

Trend analysis is used to forecast future performance based on past results. It looks ahead in the project for expected slippages and warns the PM ahead of time that there may be problems later in the schedule if established trends persist.

- This information is made available early enough in the project timeline to give the project team time to analyze and correct any anomalies.
- The results of trend analysis can be used to recommend preventive actions if necessary.

4.5 Monitor and Control Project Work

1. Work Performance Reports

WPR are available in hard copy or electronic soft copy which are created by compiling the work performance information.

- Used for reporting project status and generates the decisions, actions, awareness.
- Examples: Project Status reports, Earned value management (EVM) reports etc.

2. Change Requests

As a result of comparing planned results to actual results, change requests may be issued to expand, adjust, or reduce project scope, product scope, or quality requirements and schedule or cost baselines. Changes include but are not limited to:

- Corrective Action.
- Preventive Action.
- Defect Repair.

4.6 Perform Integrated Change Control

Reviewing all change requests; approving changes and managing changes to deliverables, organizational process assets, project documents, and the project management plan; and communicating the decisions.

It includes the following change management activities in detail:

- Identifying that a change needs to occur.
- Influencing the factors that circumvent integrated change control so that only approved changes are implemented.
- Reviewing and approving requested changes.
- Managing the approved changes when they occur, by regulating the flow of requested changes.
- Maintaining the integrity of baselines by releasing only approved changes for incorporation into project products or services, and maintaining their related configuration and planning documentation.

4.6 Perform Integrated Change Control

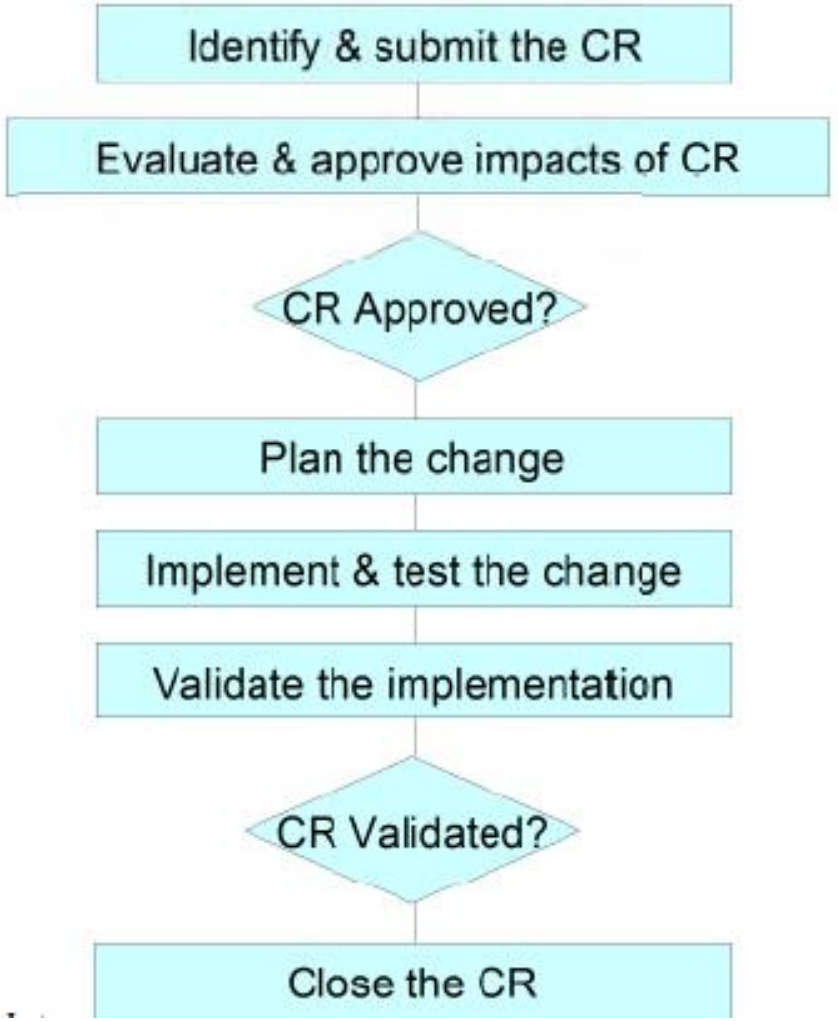
Change management Process:

1. Prevent un-necessary changes.
2. Identify necessary change.
3. Look at the impact of the change / Impact Analysis.
4. Create a change request.
5. Perform Integrated Change Control.
6. Assess the change & Look for options.
7. Change is approved or rejected.
8. Adjust the PMP and re-baseline.
9. Notify stakeholders affected by the change.
10. Manage the project based on the re-baselined plan.

UNLESS THE QUESTION SAYS OTHERWISE, if there is a change to the project charter, the sponsor who signed or approved the project charter has to make the final decision. The PM may provide options.

4.6 Perform Integrated Change Control

Change management Life cycle



4.6 Perform Integrated Change Control

Requirement for Change

There are two things you should require at the beginning of all projects regarding change:

- All change requests must be documented.
- All change requests must come through the formal change control system. Make sure no one is allowed to go directly to team members and request changes without the PM's notice.

4.6 Perform Integrated Change Control

Change Control Board (CCB)

The board is given the authority to approve or reject change requests as defined by the organization.

- The CCB may meet only once a week, once every other week, or even once a month, depending on the project.
- When emergencies arise, the pre-established CCB procedures allow CCB to treat those emergency changes appropriately.
- CCB members may include stakeholders, managers, project team members, and Change Management Experts.

4.6 Perform Integrated Change Control

Inputs

1. Project management plan
   - Change management plan
   - Configuration management plan
   - All baselines
2. Project documents
   - Basis of estimates
   - Requirements traceability matrix
   - Risk report
3. Work performance reports
4. Change requests
5. Enterprise environmental factors
6. Organizational process assets

Tools & Techniques

1. Expert Judgment
2. Change control tools
3. Data analysis
   - Alternative analysis
   - Cost-benefit analysis
4. Decision making
   - Voting
   - Autocratic decision making
   - Multi-criteria decision analysis
5. Meetings

Outputs

1. Approved change requests
2. PMP updates
3. Project documents updates
   - Change log

4.6 Perform Integrated Change Control

1. Project management plan

Include but are not limited to:

- **Change management plan**. It provides the direction for managing the change control process and documents the roles and responsibilities of the change control board (CCB).
- **Configuration management plan**. It describes the configurable items of the project and identifies the items that will be recorded and updated so that the product of the project remains consistent and operable.
- **Scope, schedule and cost baselines**.

2. Project documents

Include but are not limited to:

- Basis of estimates. (Sec 6.4.3.2)
- Requirements traceability matrix. (Sec 5.2.3.2)
- Risk reports (Sec 11.2.3.2)

4.6 Perform Integrated Change Control

6. Organizational Process Assets

Include but are not limited to:

- Change control procedures, including the steps by which organizational standards, policies, plans, procedures, or any project documents will be modified, and how any changes will be approved and validated;
- Procedures for approving and issuing change authorizations;
- Configuration management knowledge base containing the versions and baselines of all official organizational standards, policies, procedures, and any project documents.

4.6 Perform Integrated Change Control

2. Change control tools

Tools should support the following configuration management activities:

- **Identify configuration item**. Identification and selection of a configuration item to provide the basis for which the product configuration is defined and verified, products and documents are labeled, changes are managed, and accountability is maintained.

- **Record and report configuration item status**. Information recording and reporting about each configuration item.

- **Perform configuration item verification and audit.** Configuration verification and configuration audits ensure that the composition of a project's configuration items is correct and that corresponding changes are registered, assessed, approved, tracked, and correctly implemented. This ensures that the functional requirements defined in the configuration documentation are met.

4.6 Perform Integrated Change Control

2. Change control tools (cont'd)

Tools should support the following change management activities as well:

- **Identify changes**. Identifying and selecting a change item for processes or project documents.
- **Document changes**. Documenting the change into a proper change request.
- **Decide on changes**. Reviewing the changes; approving, rejecting, deferring, or making any other decision about changes to the project documents, deliverables, or baselines.
- **Track changes.** Verifying that the changes are registered, assessed, approved, and tracked and communicating final results to stakeholders.

4.6 Perform Integrated Change Control

3. Data analysis

It includes but not limited to:

- **Alternatives analysis**, used to assess the requested changes and decide which are accepted, rejected, or need to be modified to be finally accepted.
- **Cost-benefit analysis**, helps to determine if the requested change is worth its associated cost.

5. Meetings

A change control board (CCB) is responsible for meeting and reviewing the change requests and approving or rejecting those change requests .

- All change control board decisions are documented and communicated to the stakeholders for information and follow up actions.

4.6 Perform Integrated Change Control

1. Approved Change requests

2. PMP Updates

PMP that may be updated include:

- Any subsidiary plans.
- Baselines that are subject to the formal change control process.

3. Project documents updates:

Change Log: A change log is used to document changes that occur during the project.

- It contains the information about the change requests.
- Contains the status of the respective changes (approved / rejected / On hold).

NOTE: "Change requests" will be an output of several processes. But "Approved change requests" will be an output only of *Integrated Change Control* process

4.7 Close Project or Phase

Finalizing all activities to formally complete the project, phase or contract. Three main objectives: Formal ending of work, gather lessons learned and release resources.

- Review the PMP.
- Transfer to next phase or to production/operations.
- Establish procedure to investigate/document if project/phase is completed.
- Audit success/failure stories.
- Collect phases or project records.
- Gather lessons learned.
- Archive project information.

4.7 Close Project or Phase

The activities necessary for the **administrative closure** of the project or phase include:

- Actions and activities necessary to satisfy completion or exit criteria for the phase or project such as:
  - Making certain that all documents and deliverables are up-to-date and that all issues are resolved;
  - Confirming the delivery and formal acceptance of deliverables by the customer;
  - Ensuring that all costs are charged to the project;
  - Closing project accounts;
  - Reassigning personnel;
  - Dealing with excess project material;
  - Reallocating project facilities, equipment, and other resources;
  - Elaborating the final project reports as required by organizational policies.
- …

4.7 Close Project or Phase

- …
- Activities related to the completion of the **contractual agreements** applicable to the project or project phase such as:
  - Confirming the formal acceptance of the seller's work,
  - Finalizing open claims,
  - Updating records to reflect final results, and
  - Archiving such information for future use.
- Activities needed to:
  - Collect project or phase records,
  - Audit project success or failure,
  - Manage knowledge sharing and transfer,
  - Identify lessons learned, and
  - Archive project information for future use by the organization.
- …

Exam Spotlight

Project closure occurs at the end of each phase in order to properly document project information and keep it safe for future reference, no matter if the phase was completed successfully or was ended for some other reason.

4.7 Close Project or Phase

- …
- Actions and activities necessary to transfer the project's products, services, or results to the next phase or to production and/or operations.
- Collecting any suggestions for improving or updating the policies and procedures of the organization, and sending them to the appropriate organizational unit.
- Measuring stakeholder satisfaction.

The Close Project or Phase process also establishes the procedures to investigate and document the reasons for actions taken if a project is terminated before completion. In order to successfully achieve this, the PM needs to engage all the proper stakeholders in the process.

4.7 Close Project or Phase

Project Closure

Projects come to an end for several reasons:

- They're completed successfully.
- They're cancelled or killed prior to completion.
- They evolve into ongoing operations and no longer exist as projects.

- There are four formal types of project endings you might need to know for the exam:
  a. **Addition**
  b. **Starvation**
  c. **Integration**
  d. **Extinction**

4.7 Close Project or Phase

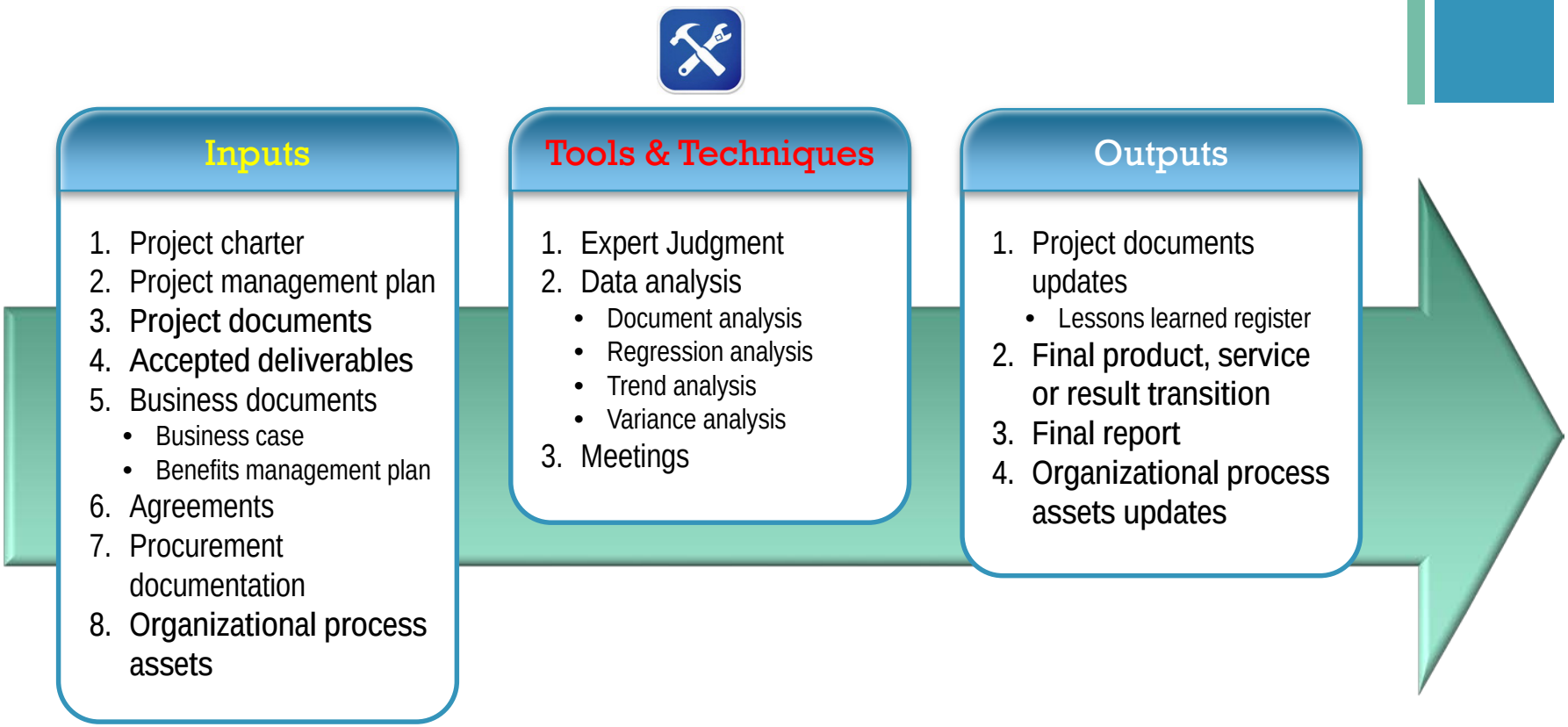
a. **Addition**: Projects that evolve into ongoing operations are considered projects that end due to *addition;* in other words, they become their own ongoing business unit.

b. **Starvation**: When resources are cut off from the project or are no longer provided to the project, it starved prior to completing all the requirements and you're left with an unfinished project on your hands.

c. **Integration**: Integration occurs when the resources of the project, (people, equipment, property, and supplies) are distributed to other areas in the organization or are assigned to other projects.

d. **Extinction**: This is the best kind of project end because *extinction* means the project has been completed and accepted by the stakeholders. As such, it no longer exists because it had a definite ending date, the goals of the project were achieved, and the project was closed out.

4.7 Close Project or Phase



4.7 Close Project or Phase

3. Project documents

Project documents that may be inputs for this process include:

- Assumption log.
- Basis of estimates.
- Change log.
- Issue log.
- Lessons learned register.
- Milestone list.
- Project communications.
- Quality control measurements.
- Quality reports.
- Requirements documentation.
- Risk register.
- Risk report.

4.7 Close Project or Phase

4. Accepted Deliverables

Those deliverables that have been accepted through the *Validate Scope* process.

8. Organizational Process Assets

- Project or phase closure guidelines or requirements (project audits, project evaluations, and transition criteria).
- Configuration management knowledge base containing the versions and baselines of all official organizational standards, policies, procedures, and any project documents..

4.7 Close Project or Phase

2. Final Product, Service or Result Transition

This actually refers to the acceptance of the final product, service, or result and the turnover of the product to the organization.

- This refers to the transition of the final product, service, or result that the project was authorized to produce
- This usually requires a formal sign-off and, in the case of a project performed on contract, definitely requires a formal sign-off or receipt indicating acceptance of the project.

4.7 Close Project or Phase

3. Final report

The final report provides a summary of the project performance. It can include information such as:

- Summary level description of the project or phase.
- Scope objectives, the criteria used to evaluate the scope, and evidence that the completion criteria were met.
- Quality objectives, the criteria used to evaluate the project and product quality, the verification and actual milestone delivery dates, and reasons for variances.
- Cost objectives, including the acceptable cost range, actual costs, and reasons for any variances.
- Summary of the validation information for the final product, service, or result.
- …

4.7 Close Project or Phase

3. Final report (cont'd)

- …
- Schedule objectives including whether results achieved the benefits that the project was undertaken to address. If the benefits are not met at the close of the project, indicate the degree to which they were achieved and estimate for future benefits realization.
- Summary of how the final product, service, or result achieved the business needs identified in the business plan. If the business needs are not met at the close of the project, indicate the degree to which they were achieved and estimate for when the business needs will be met in the future.
- Summary of any risks or issues encountered on the project and how they were addressed.

4.7 Close Project or Phase

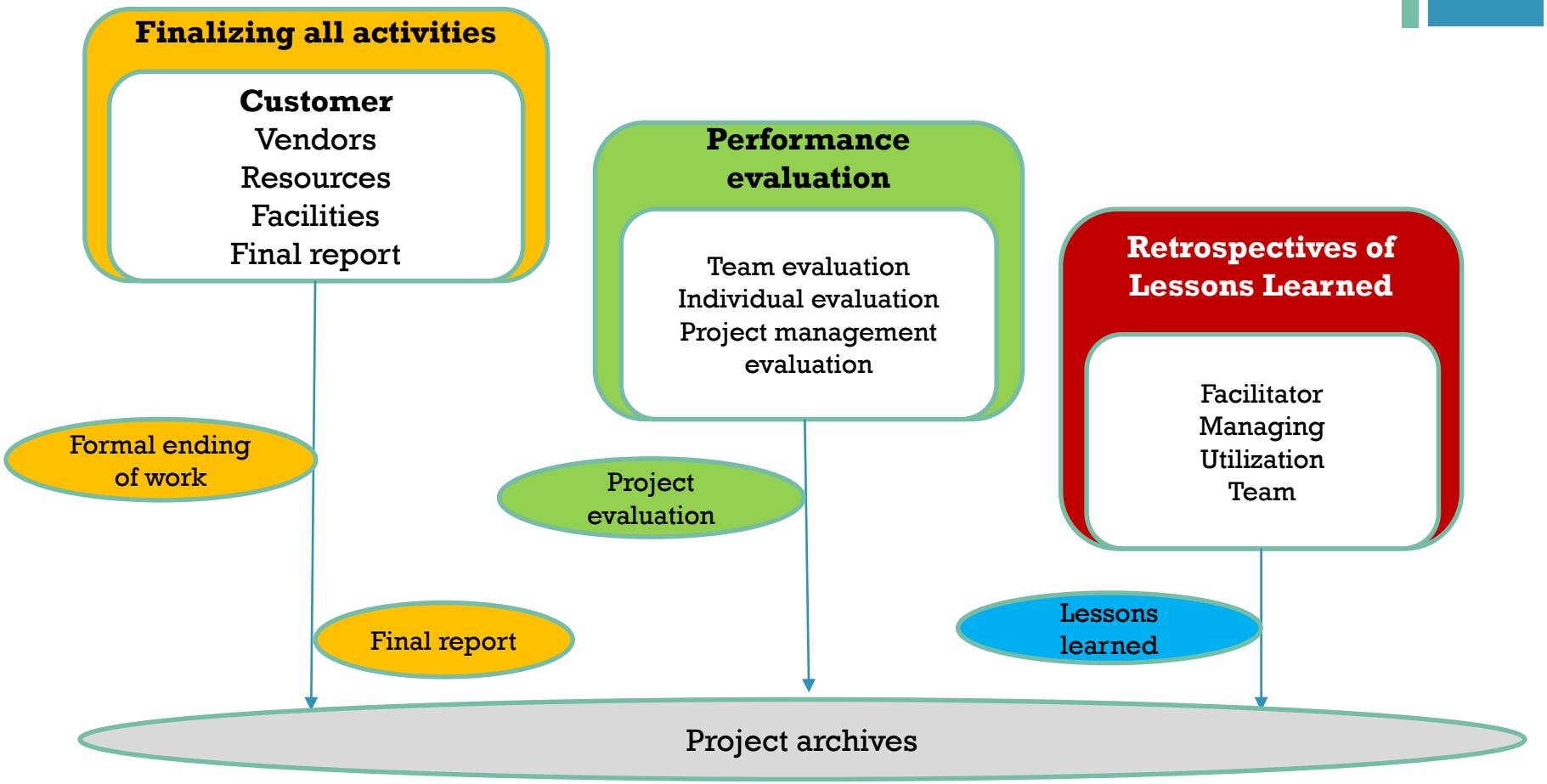
4. Organizational Process Assets Updates

Include but are not limited to:

- **Project documents**. Documentation resulting from the project's activities;
- **Operational and support documents**. Documents required for an organization to maintain, operate, and support the product or service delivered by the project. These may be new documents or updates to existing documents.
- **Project or phase closure documents**. consisting of formal documentation that indicates completion of the project or phase and the transfer of the completed project or phase deliverables to others
- **Lessons learned repository**. Lessons learned and knowledge gained throughout the project are transferred to the lessons learned repository for use by future projects.

4.7 Close Project or Phase – General Info

Retrospective methodology



4.7 Close Project or Phase – General Info

Final Report - Model

Executive summary: Highlights key findings and facts: Are the project objectives met? Are stakeholders satisfied? Are project deliver cables being used as expected? Final time, cost and scope performances are listed, major problems and key lessons learned…

Review and analysis: Succinct, factual review statement of the project are presented: project mission and objectives, procedures and systems used and organizational resources used. Project **performances** are analyzed in details. The analysis examines the underlying causes of problems, issues and successes…

Recommendations: Propose major improvement actions that should take place focusing on technical solutions to problems that surfaced. For example, shifting to more resilient building material or terminating vendor or contractor relationship…

Lessons learned: lessons learned are succinctly and clearly set out focusing on the need to help others in future projects…

Appendix: Critical and pertinent information are annexed. May include details of analysis or other data…

4.7 Close Project or Phase – General Info

Project evaluation - Model

Team evaluation: The evaluation of teams can be performed using survey techniques normally restricted to team members , but in some cases, other project stakeholders may be included in the survey. The results are reviewed between the team and the facilitator and/or senior management…

Individual Team Member Review: Within a functional organization, the team member's functional manager, not the PM, is generally responsible for assessing performance. In a balanced matrix, the PM and the functional manager jointly evaluate the team member's performance. In strong matrix and projects organizations, the PM is responsible for appraising individual performance. "360-degree feedback" evaluation process……

PM Review: In general ,the same process that is used to evaluate the PM performance. In project-driven organizations, the PMO is typically responsible for collecting information on a specific PM from customers, vendors, team members, peers and other managers…

4.7 Close Project or Phase – General Info

Lessons Learned - Model

Definition: " Lessons Learned " represent analysis made during and at the end of a project attempting to capture positive and negative project learning…. WHAT WORKED AND WHAT DID NOT?

Barriers to fully exploit the lessons learned:
-Lack of time to capture lessons learned…
-Most lessons learned are captured when the project is complete…
-Lessons learned often degenerate into blame sessions …
-Lessons learned not used in future projects … The organizational culture is not supporting the value of learning…

We need a methodology that overcomes those barriers, ensuring:
- Lessons learned are identified and utilized and
- Are part of the organizational culture

4.7 Close Project or Phase – General Info

Retrospectives - Model

Definition : "***A retrospective is a methodology that analyzes a past project event to determine what worked and what didn't, develops lessons learned, and creates an action plan that ensures lessons learned are used to improve management of future projects***" ***Norman Kerth***.

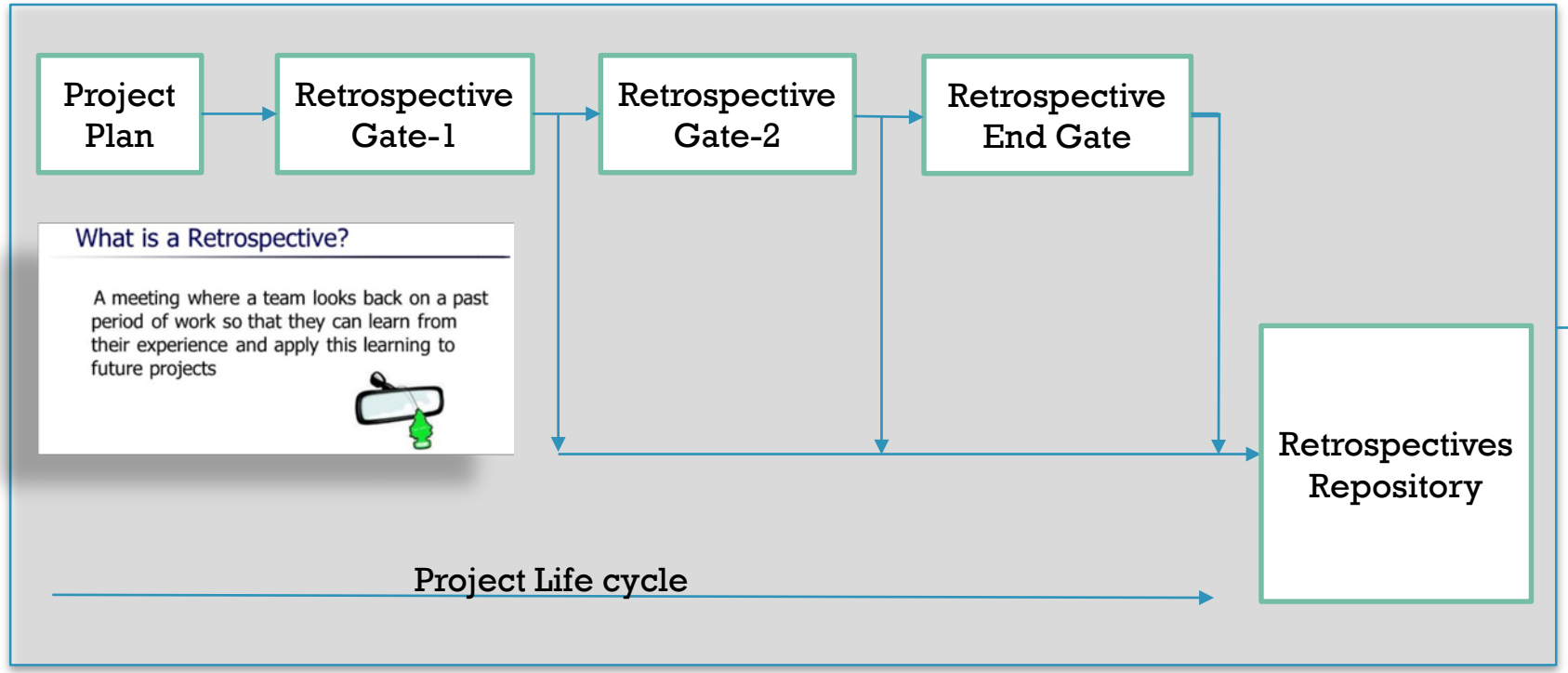
"**Retrospectives**" methodology emerged as a strong process and management philosophy used by project-driven organizations, with the following characteristics:

- Includes a minimum of three in-process learning gates during the project life cycle.
- Uses an independent facilitator.
- Has an owner.
- Develops a repository that is easy to use.
- Mandates a discipline that ensures retrospectives are used.

Norman Kerth

4.7 Close Project or Phase – General Info

Retrospectives - Model



Thank you

Knowledge area

- You can find the whole Project Management Professional course on Z:\eLibraries\eBooks\Management\PMP 6 Course.
- You can also visit www.pmi.org for more information.

Please call us for any support