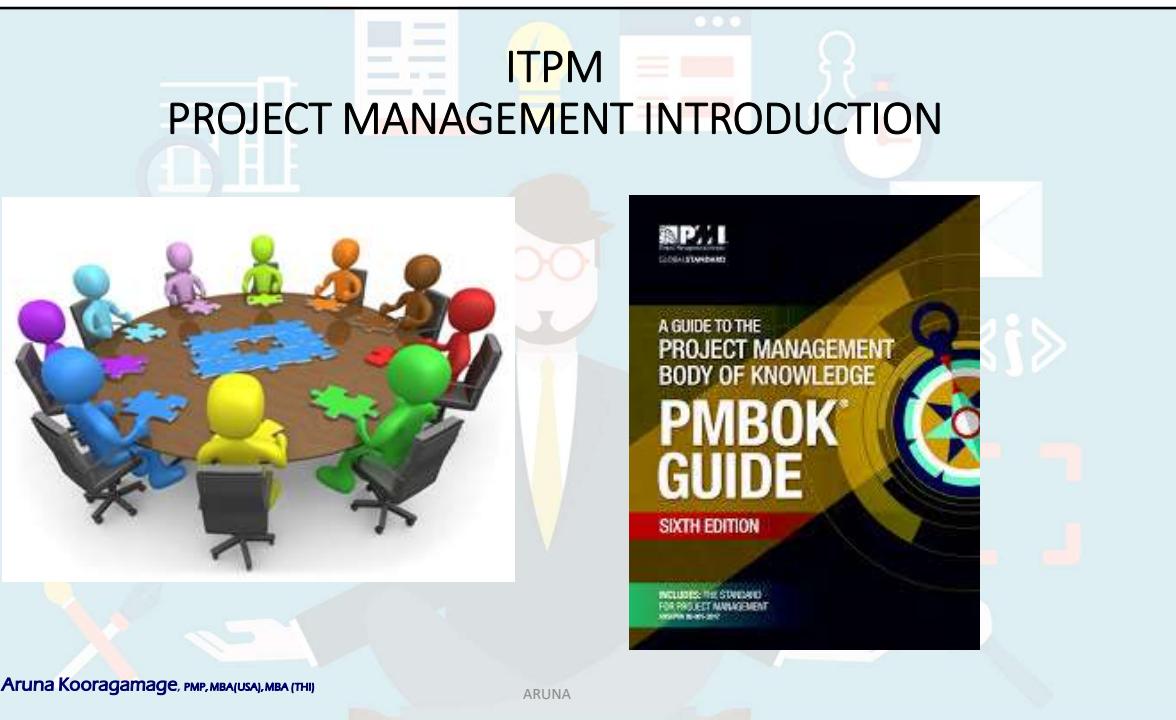


# ITPM PROJECT MANAGEMENT INTRODUCTION



Aruna Kooragamage, PMP, MBA(USA), MBA (THI)

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## What is a Project ?

- A project is a temporary endeavor undertaken to create a unique product, service, or result.
- **Unique product, service, or result.**
  - Projects are undertaken to fulfill objectives by producing deliverables.
  - An objective is defined as an outcome toward which work is to be directed, a strategic position to be attained,
  - A purpose to be achieved, a result to be obtained, a product to be produced, or a service to be performed.
  - A deliverable is defined as any unique and verifiable product, result, or capability to perform a service that is required to be produced to complete a process, phase, or project. Deliverables may be tangible or intangible

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Fulfillment of project objectives may produce one or more of the following deliverables

- A unique product that can be either a component of another item, an enhancement or correction to an item, or a new end item in itself (e.g., the correction of a defect in an end item);
- A unique service or a capability to perform a service (e.g., a business function that supports production or distribution);
- A unique result, such as an outcome or document (e.g., a research project that develops knowledge that can be used to determine whether a trend exists or a new process will benefit society); and
- A unique combination of one or more products, services, or results (e.g., a software application, its associated documentation, and help desk services).

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## EXAMPLES OF PROJECTS INCLUDE BUT ARE NOT LIMITED TO:

- Developing a new pharmaceutical compound for market,
- Expanding a tour guide service,
- Merging two organizations,
- Improving a business process within an organization,
- Acquiring and installing a new computer hardware system for use in an organization,
- Exploring for oil in a region,
- Modifying a computer software program used in an organization,
- Conducting research to develop a new manufacturing process, and
- Constructing a building.

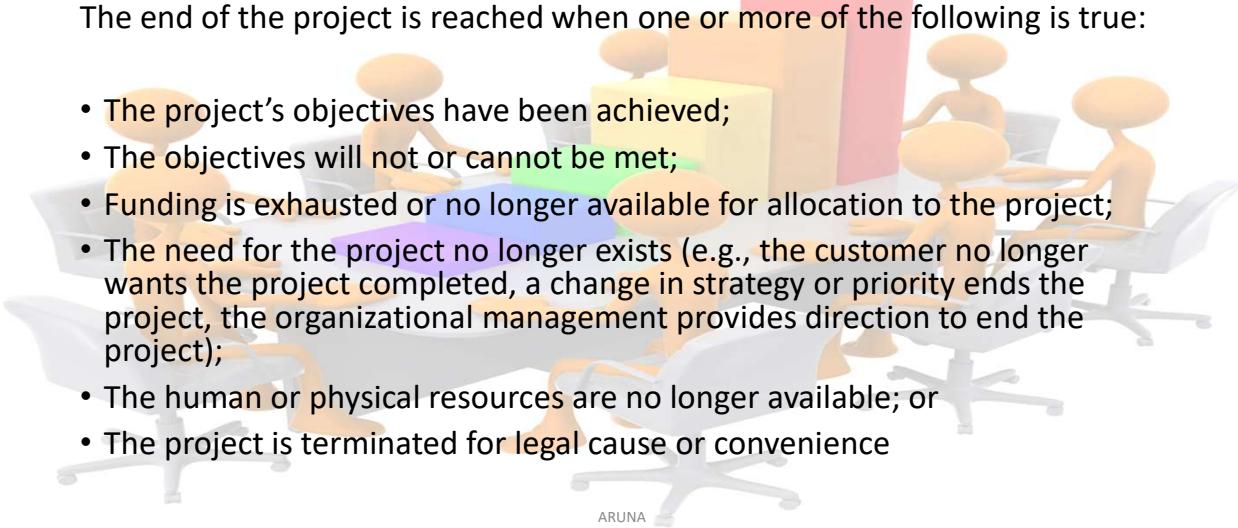
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## Temporary endeavor

The temporary nature of projects indicates that a project has a definite beginning and end. Temporary does not necessarily mean a project has a short duration

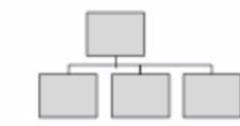
The end of the project is reached when one or more of the following is true:

- The project's objectives have been achieved;
- The objectives will not or cannot be met;
- Funding is exhausted or no longer available for allocation to the project;
- The need for the project no longer exists (e.g., the customer no longer wants the project completed, a change in strategy or priority ends the project, the organizational management provides direction to end the project);
- The human or physical resources are no longer available; or
- The project is terminated for legal cause or convenience



Business Value

*Organization*



Future State

Project

- Project Tasks
- Activity A
  - Activity B
  - Activity C
  - Etc.

Current State

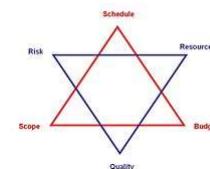
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Time

**Managing a Project typically includes, but is not limited to :**

- Identifying requirement
- Addressing the various needs, concerns and expectations of the stakeholders in planning and executing the project;
- Setting up, maintaining and, carrying out communications among stakeholders that are active, effective, and collaborative in nature;
- Balancing the competing project constraints, which include, but are not limited to:
  - Scope,
  - Quality,
  - Schedule,
  - Budget,
  - Resources, and
  - Risks.

"Triple Constraint" in Project Management



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## Projects enable business value creation

Examples of tangible elements include

- Monetary assets,
- Stockholder equity,
- Utility,
- Fixtures,
- Tools, and
- Market share.

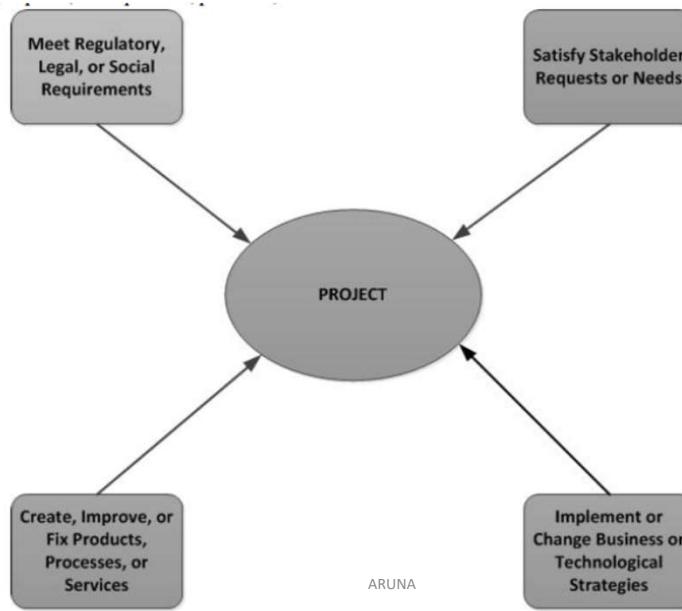


Examples of intangible elements include:

- Goodwill,
- Brand recognition,
- Public benefit,
- Trademarks,
- Strategic alignment, and
- Reputation.

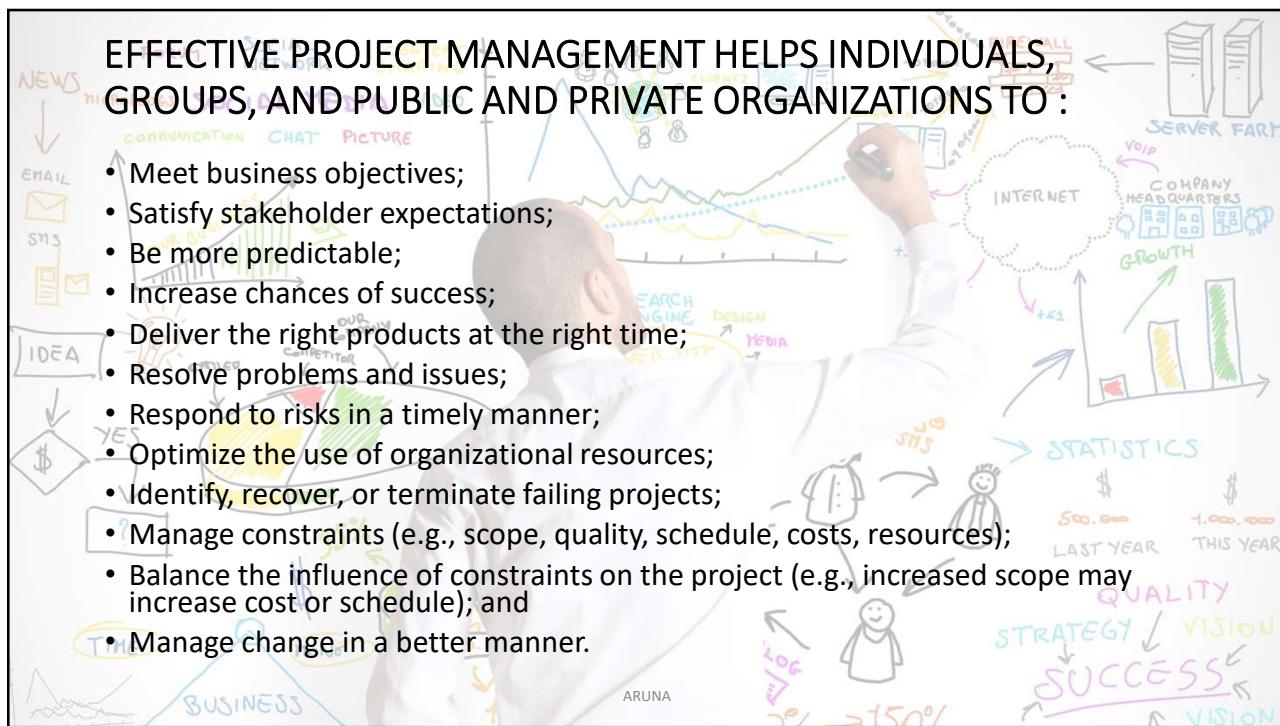


## PROJECT INITIATION CONTEXT



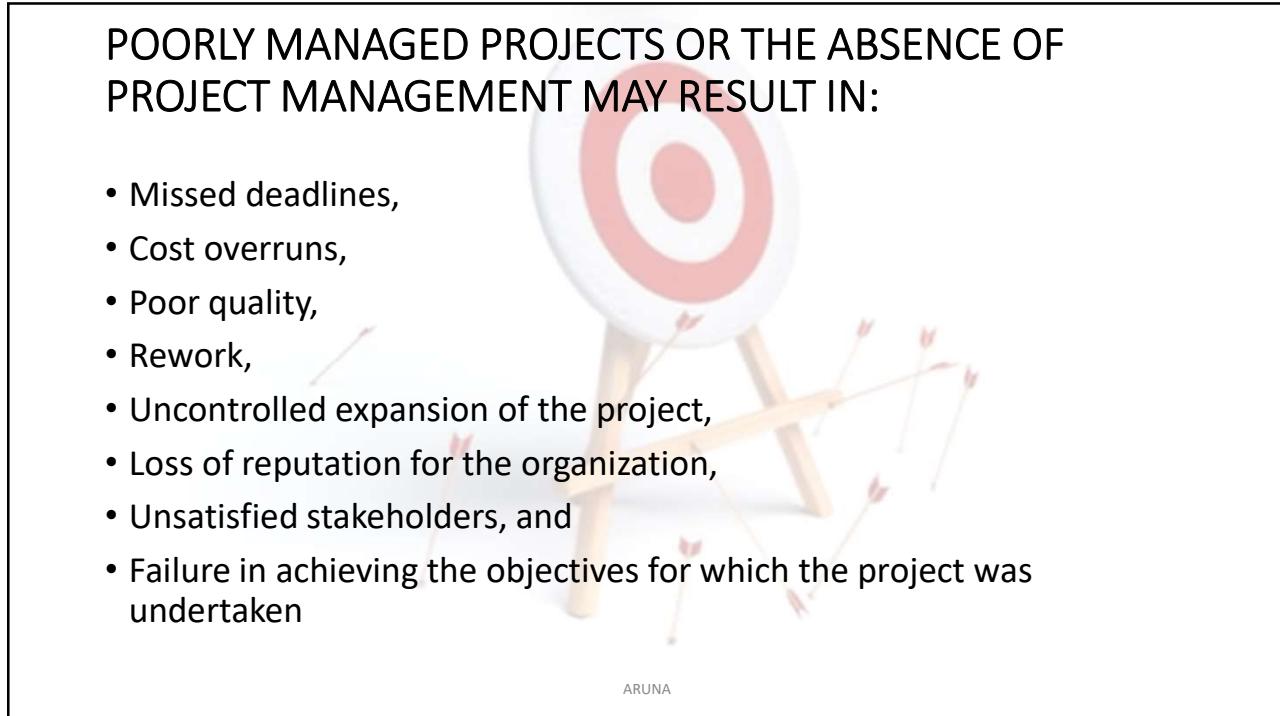
## EFFECTIVE PROJECT MANAGEMENT HELPS INDIVIDUALS, GROUPS, AND PUBLIC AND PRIVATE ORGANIZATIONS TO :

- Meet business objectives;
- Satisfy stakeholder expectations;
- Be more predictable;
- Increase chances of success;
- Deliver the right products at the right time;
- Resolve problems and issues;
- Respond to risks in a timely manner;
- Optimize the use of organizational resources;
- Identify, recover, or terminate failing projects;
- Manage constraints (e.g., scope, quality, schedule, costs, resources);
- Balance the influence of constraints on the project (e.g., increased scope may increase cost or schedule); and
- Manage change in a better manner.



## POORLY MANAGED PROJECTS OR THE ABSENCE OF PROJECT MANAGEMENT MAY RESULT IN:

- Missed deadlines,
- Cost overruns,
- Poor quality,
- Rework,
- Uncontrolled expansion of the project,
- Loss of reputation for the organization,
- Unsatisfied stakeholders, and
- Failure in achieving the objectives for which the project was undertaken



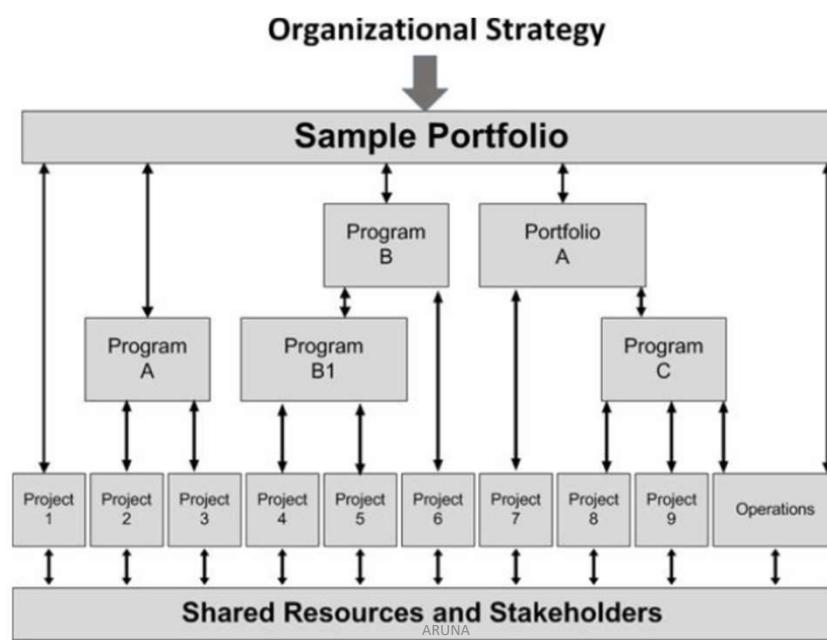
Effective and efficient project management should be considered a strategic competency within organizations. It enables organizations to:

- Tie project results to business goals,
- Compete more effectively in their markets,
- Sustain the organization, and
- Respond to the impact of business environment changes on projects by appropriately adjusting project management plans



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#### RELATIONSHIP OF PROJECT, PROGRAM, PORTFOLIO, AND OPERATIONS MANAGEMENT



ORGANIZATIONAL PROJECT MANAGEMENT			
	PROJECTS	PROGRAMS	PORTFOLIOS
<b>Definition</b>	A project is a temporary endeavor undertaken to create a unique product, service, or result.	A program is a group of related projects, other programs, and program activities that are managed in a coordinated manner to obtain benefits not available from managing them individually.	A portfolio is a collection of projects, programs, and operations managed as a group to achieve strategic objectives.
<b>Scope</b>	Projects have defined objectives. Scope is progressively elaborated throughout the project life cycle.	Programs have a scope that encompasses the scopes of its program components. Programs produce benefits to an organization by ensuring that the outputs and outcomes of program components are delivered in a coordinated and complementary manner.	Portfolios have an organizational scope that changes with the strategic objectives of the organization.
<b>Change</b>	Project managers expect change and implement processes to keep change managed and controlled.	Programs are managed in a manner that accepts and adapts to change as necessary to optimize the delivery of benefits as the program's components deliver outcomes and/or outputs.	Portfolio managers continuously monitor changes in the broader internal and external environments.
<b>Planning</b>	Project managers progressively elaborate high-level information into detailed plans throughout the project life cycle.	Programs are managed using high-level plans that track the interdependencies and progress of program components. Program plans are also used to guide planning at the component level.	Portfolio managers create and maintain necessary processes and communication relative to the aggregate portfolio.
<b>Management</b>	Project managers manage the project team to meet the project objectives.	Programs are managed by program managers who ensure that program benefits are delivered as expected, by coordinating the activities of a program's components.	Portfolio managers may manage or coordinate portfolio management staff, or program and project staff that may have reporting responsibilities into the aggregate portfolio.
<b>Monitoring</b>	Project managers monitor and control the work of producing the products, services or results that the project was undertaken to produce.	Program managers monitor the progress of program components to ensure the overall goals, schedules, budget, and benefits of the program will be met.	Portfolio managers monitor strategic changes and aggregate resource allocation, performance results, and risk of the portfolio.
<b>Success</b>	Success is measured by product and project quality, timeliness, budget compliance, and degree of customer satisfaction.	A program's success is measured by the program's ability to deliver its intended benefits to an organization, and by the program's efficiency and effectiveness in delivering those benefits.	Success is measured in terms of the aggregate investment performance and benefit realization of the portfolio.

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## PROGRAM MANAGEMENT

- Aligning with the organizational or strategic direction that affects program and project goals and objectives;
- Allocating the program scope into program components;
- Managing interdependencies among the components of the program to best serve the program;
- Managing program risks that may impact multiple projects in the program;
- Resolving constraints and conflicts that affect multiple projects within the program;
- Resolving issues between component projects and the program level;
- Managing change requests within a shared governance framework;
- Allocating budgets across multiple projects within the program; and
- Assuring benefits realization from the program and component projects.

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## PORTRFOIO MANAGEMENT

- Guide organizational investment decisions.
- Select the optimal mix of programs and projects to meet strategic objectives.
- Provide decision-making transparency.
- Prioritize team and physical resource allocation.
- Increase the likelihood of realizing the desired return on investment.
- Centralize the management of the aggregate risk profile of all components

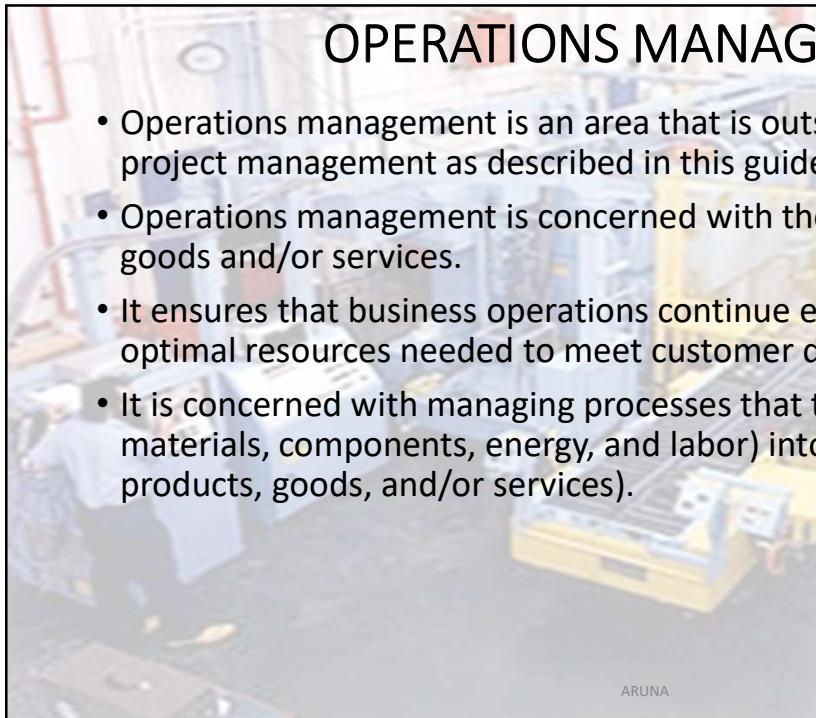


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## OPERATIONS MANAGEMENT

- Operations management is an area that is outside the scope of formal project management as described in this guide.
- Operations management is concerned with the ongoing production of goods and/or services.
- It ensures that business operations continue efficiently by using the optimal resources needed to meet customer demands
- It is concerned with managing processes that transform inputs (e.g., materials, components, energy, and labor) into outputs (e.g., products, goods, and/or services).



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## OPERATIONS AND PROJECT MANAGEMENT

- When developing a new product, upgrading a product, or expanding outputs;
- While improving operations or the product development process;
- At the end of the product life cycle; and
- At each closeout phase.



## ORGANIZATIONAL PROJECT MANAGEMENT (OPM) AND STRATEGIES

- Portfolio management aligns portfolios with organizational strategies by selecting the right programs or projects, prioritizing the work, and providing the needed resources.
- Program management harmonizes its program components and controls interdependencies in order to realize specified benefits.
- Project management enables the achievement of organizational goals and objectives



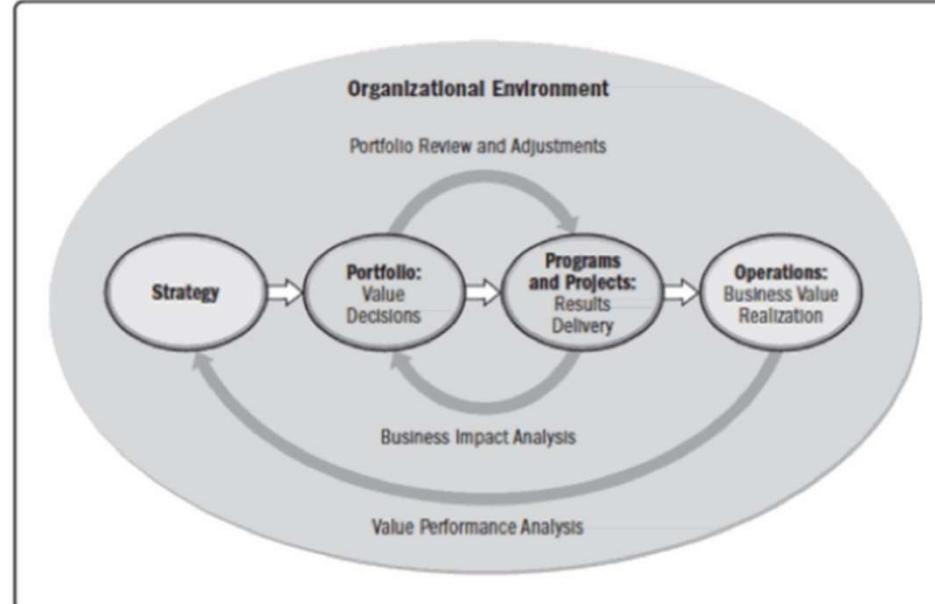


Figure 1-4. Organizational Project Management (Source ARUNA OPM3®)

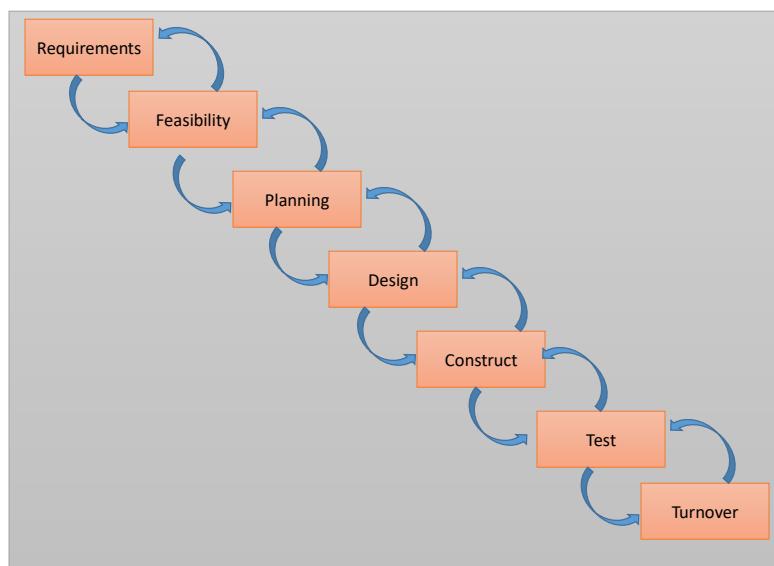
PMBOK® Guide Key Component	Brief Description
Project life cycle (Section 1.2.4.1)	The series of phases that a project passes through from its start to its completion.
Project phase (Section 1.2.4.2)	A collection of logically related project activities that culminates in the completion of one or more deliverables.
Phase review (Section 1.2.4.3)	A review at the end of a phase in which a decision is made to continue to the next phase, to continue with modification, or to end a program or project.
Project management processes (Section 1.2.4.4)	A systematic series of activities directed toward causing an end result where one or more inputs will be acted upon to create one or more outputs.
Project Management Process Group (Section 1.2.4.5)	A logical grouping of project management inputs, tools and techniques, and outputs. The Project Management Process Groups include Initiating, Planning, Executing, Monitoring and Controlling, and Closing. Project Management Process Groups are not project phases.
Project Management Knowledge Area (Section 1.2.4.6)	An identified area of project management defined by its knowledge requirements and described in terms of its component processes, practices, inputs, outputs, tools, and techniques.

# PROJECT AND DEVELOPMENT LIFE CYCLES

- In a predictive life cycle, the project scope, time, and cost are determined in the early phases of the life cycle. Any changes to the scope are carefully managed. Predictive life cycles may also be referred to as waterfall life cycles.
- In an iterative life cycle, the project scope is generally determined early in the project life cycle, but time and cost estimates are routinely modified as the project team's understanding of the product increases.
- Iterations develop the product through a series of repeated cycles, while increments successively add to the functionality of the product.
- In an incremental life cycle, the deliverable is produced through a series of iterations that successively add functionality within a predetermined time frame. The deliverable contains the necessary and sufficient capability to be considered complete only after the final iteration.

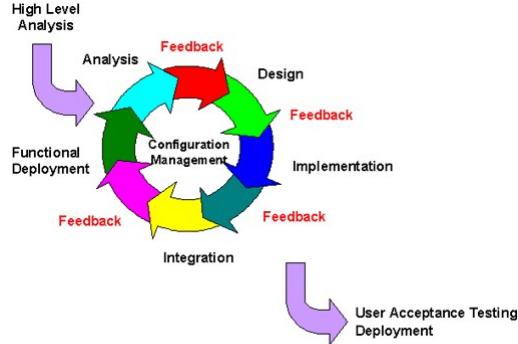
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## PREDICTIVE LIFE CYCLES



## ITERATIVE AND INCREMENTAL LIFE CYCLES

Oncs in which project phases ( also called iterations) internationally repeat one or more project activities as the project team's understanding of the project increases.

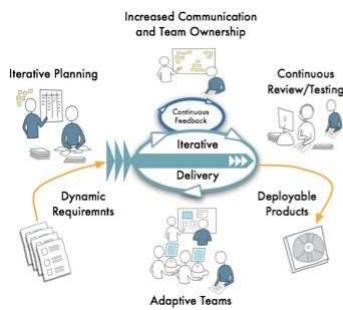


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## ADAPTIVE LIFE CYCLES

Also known as change-driven or agile methods are intended to respond to high levels of change and ongoing stakeholder involvement.



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# PROJECT AND DEVELOPMENT LIFE CYCLES

- Adaptive life cycles are agile, iterative, or incremental. The detailed scope is defined and approved before the start of an iteration. Adaptive life cycles are also referred to as agile or change-driven life cycles.
- A hybrid life cycle is a combination of a predictive and an adaptive life cycle. Those elements of the project that are well known or have fixed requirements follow a predictive development life cycle, and those elements that are still evolving follow an adaptive development life cycle.

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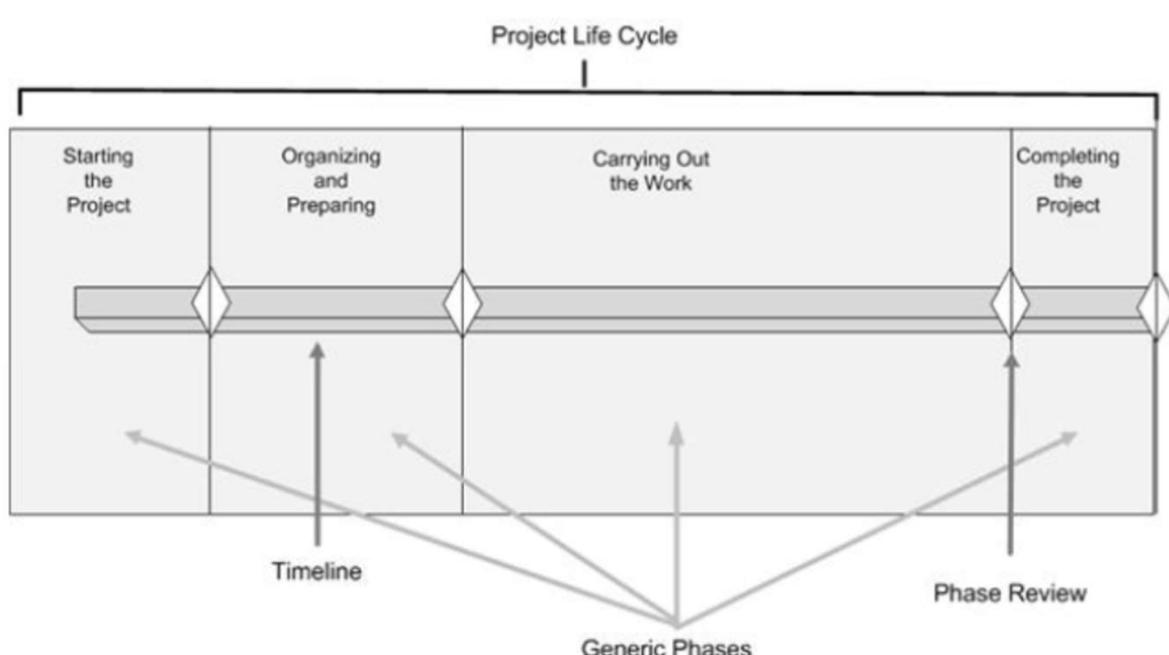


Figure 1-5. Interrelationship of PMBOK® Guide Key Components in Projects

## PROJECT PHASE

Attributes may include but are not limited to:

- Name (e.g., Phase A, Phase B, Phase 1, Phase 2, proposal phase),
- Number (e.g., three phases in the project, five phases in the project),
- Duration (e.g., 1 week, 1 month, 1 quarter),
- Resource requirements (e.g., people, buildings, equipment),
- Entrance criteria for a project to move into that phase (e.g., specified approvals documented, specified documents completed), and
- Exit criteria for a project to complete a phase (e.g., documented approvals, completed documents, completed deliverables).

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## PROJECT PHASE

Examples of phase names include but are not limited to :

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>• Concept development,</li> <li>• Feasibility study,</li> <li>• Customer requirements,</li> <li>• Solution development,</li> <li>• Design,</li> <li>• Prototype,</li> </ul> | <ul style="list-style-type: none"> <li>• Build,</li> <li>• Test,</li> <li>• Transition,</li> <li>• Commissioning,</li> <li>• Milestone review, and</li> <li>• Lessons learned</li> </ul> |
|--|--|

Time

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## PHASE GATE

A phase gate, is held at the end of a phase. The project's performance and progress are compared to project and business documents including but not limited to:

- Project business case
- Project charter
- Project management plan and
- Benefits management plan

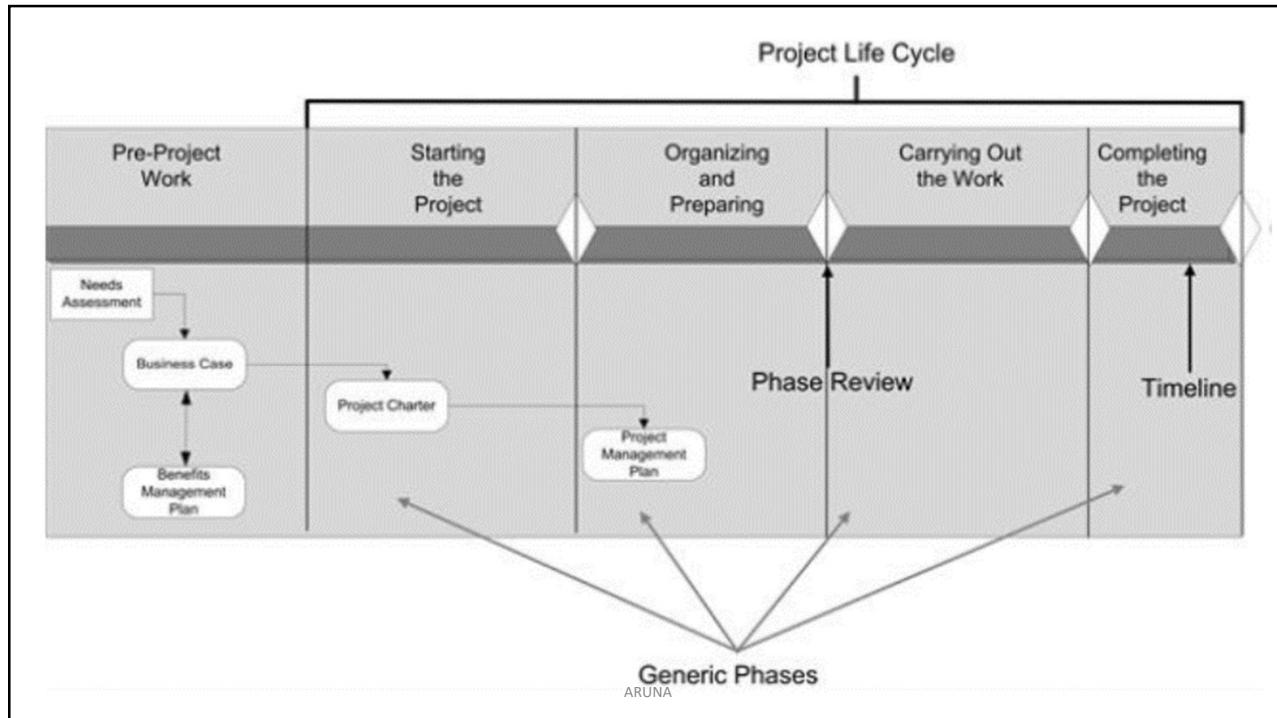
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## PHASE GATE

A decision (e.g., go/no-go decision) is made as a result of this comparison to:

- Continue to the next phase,
- Continue to the next phase with modification,
- End the project,
- Remain in the phase, or
- Repeat the phase or elements of it.

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## PROJECT MANAGEMENT PROCESSES

- **Processes used once or at predefined points in the project.** The processes *Develop Project Charter* and *Close Project or Phase* are examples
- **Processes that are performed periodically as needed.** The process *Acquire Resources* is performed as resources are needed.
- **Processes that are performed continuously throughout the project.** The process *Define Activities* may occur throughout the project life cycle, especially if the project uses rolling wave planning or an adaptive development approach

## PROJECT MANAGEMENT PROCESS GROUPS

- **Initiating Process Group.** Those processes performed to define a new project or a new phase of an existing project by obtaining authorization to start the project or phase.
- **Planning Process Group.** Those processes required to establish the scope of the project, refine the objectives, and define the course of action required to attain the objectives that the project was undertaken to achieve.
- **Executing Process Group.** Those processes performed to complete the work defined in the project management plan to satisfy the project requirements.
- **Monitoring and Controlling Process Group.** Those processes required to track, review, and regulate the progress and performance of the project; identify any areas in which changes to the plan are required; and initiate the corresponding changes.
- **Closing Process Group.** Those processes performed to formally complete or close the project, phase, or contract

Initiation processes

Control processes

Planning processes

Close out processes

Execution processes

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## PROJECT MANAGEMENT KNOWLEDGE AREAS

- Project Integration Management.
- Project Scope Management
- Project Schedule Management.
- Project Cost Management.
- Project Quality Management.
- Project Resource Management.
- Project Communications Management.
- Project Risk Management.
- Project Procurement Management.
- Project Stakeholder Management
- Project Scope Management
- Project Time Management
- Project Cost Management
- Project Human Resource Management
- Project Quality Management
- Project Communications Management
- Project Risk Management
- Project Procurement Management
- Project Stakeholder Management

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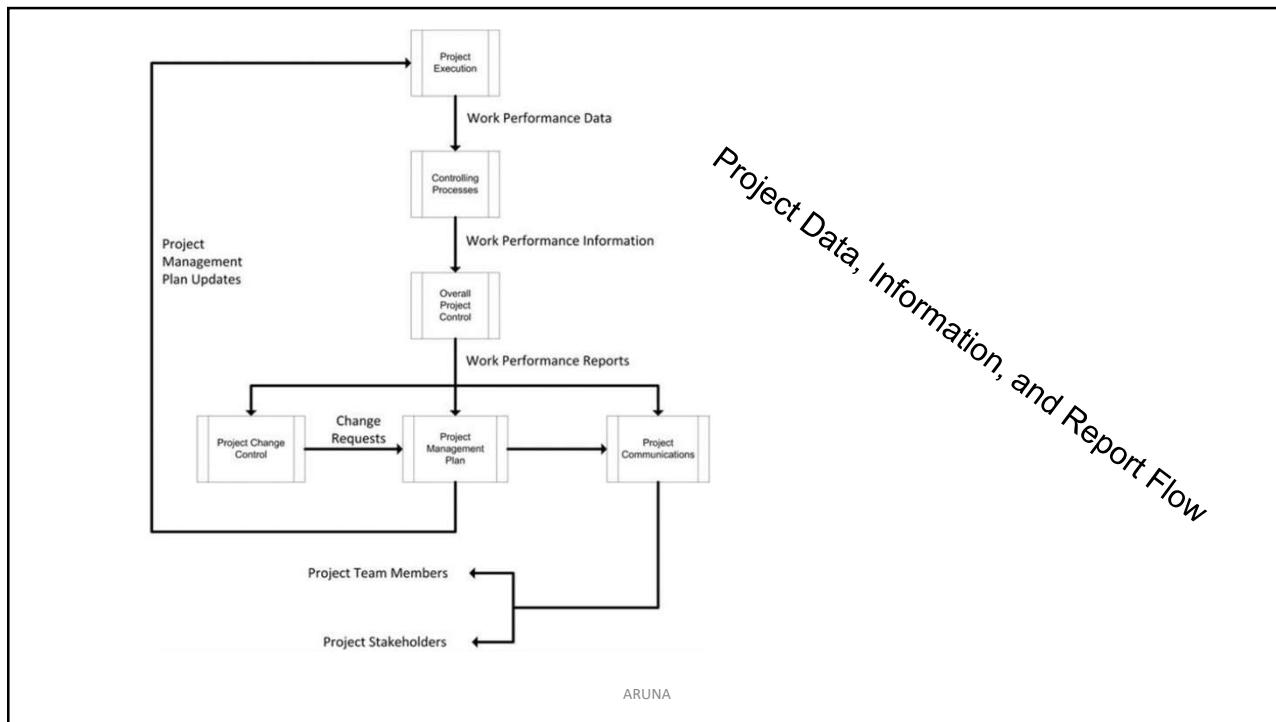


Knowledge Areas	Project Management Process Groups				
	Initiating Process Group	Planning Process Group	Executing Process Group	Monitoring and Controlling Process Group	Closing Process Group
4. Project Integration Management	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage Project Work 4.4 Manage Project Knowledge	4.5 Monitor and Control Project Work 4.6 Perform Integrated Change Control	4.7 Close Project or Phase
5. Project Scope Management		5.1 Plan Scope Management 5.2 Collect Requirements 5.3 Define Scope 5.4 Create WBS		5.5 Validate Scope 5.6 Control Scope	
6. Project Schedule Management		6.1 Plan Schedule Management 6.2 Define Activities 6.3 Sequence Activities 6.4 Estimate Activity Durations 6.5 Develop Schedule		6.6 Control Schedule	
7. Project Cost Management		7.1 Plan Cost Management 7.2 Estimate Costs 7.3 Determine Budget		7.4 Control Costs	
8. Project Quality Management		8.1 Plan Quality Management	8.2 Manage Quality	8.3 Control Quality	
9. Project Resource Management		9.1 Plan Resource Management 9.2 Estimate Activity Resources	9.3 Acquire Resources 9.4 Develop Teams	9.6 Control Resources 9.5 Manage Team	
10. Project Communications Management		10.1 Plan Communications Management	10.2 Manage Communications	10.3 Control Communications	
11. Project Risk Management		11.1 Plan Risk Management 11.2 Identify Risks 11.3 Qualitative Risk Analysis 11.4 Perform Quantitative Risk Analysis 11.5 Plan Risk Responses	11.6 Implement Risk Responses	11.7 Monitor Risks	
12. Project Procurement Management		12.1 Plan Procurement Management	12.2 Conduct Procurements	12.3 Control Procurements	
13. Project Stakeholder Management	13.1 Identify Stakeholders	13.2 Plan Stakeholder Management	13.3 Manage Stakeholder Engagement	13.4 Monitor Stakeholder Engagement	

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## PROJECT MANAGEMENT DATA AND INFORMATION

- **Work performance data.** The raw observations and measurements identified during activities performed to carry out the project work
- **Work performance information.** The performance data collected from various controlling processes, analyzed in context and integrated based on relationships across areas
- **Work performance reports.** The physical or electronic representation of work performance information compiled in project documents



## TAILORING

Specific methodology recommendations are outside the scope of this guide. Project management methodologies may be:

- Developed by experts within the organization,
- Purchased from vendors,
- Obtained from professional associations, or
- Acquired from government agencies



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## PROJECT MANAGEMENT BUSINESS DOCUMENTS

- PROJECT BUSINESS CASE

- Business needs;
- Determination of what is prompting the need for action;
- Situational statement documenting the business problem or opportunity to be addressed including the value to be delivered to the organization;
- Identification of stakeholders affected; and
- Identification of the scope.

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## PROJECT MANAGEMENT BUSINESS DOCUMENTS

- Analysis of the situation

- Identification of organizational strategies, goals, and objectives;
- Identification of root cause(s) of the problem or main contributors of an opportunity;
- Gap analysis of capabilities needed for the project versus existing capabilities of the organization;
- Identification of known risks;
- Identification of critical success factors;
- Identification of decision criteria by which the various courses of action may be assessed

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## PROJECT MANAGEMENT BUSINESS DOCUMENTS

Recommendation:

- A statement of the recommended option to pursue in the project;
- Items to include in the statement may include but are not limited to:
  - Analysis results for the potential option;
  - Constraints, assumptions, risks, and dependencies for the potential options; and
  - Success measures
- An implementation approach that may include but is not limited to:
  - Milestones,
  - Dependencies, and
  - Roles and responsibilities.
- Evaluation:
  - Statement describing the plan for measuring benefits the project will deliver. This should include any ongoing operational aspects of the recommended option beyond initial implementation

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## PROJECT BENEFITS MANAGEMENT PLAN

- Target benefits
- Strategic alignment
- Timeframe for realizing benefits
- Benefits owner
- Metrics
- Assumptions
- Risks



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# PROJECT CHARTER AND PROJECT MANAGEMENT PLAN

The project charter is defined as a document issued by the project sponsor that formally authorizes the existence of a project and provides the project manager with the authority to apply organizational resources to project activities

The project management plan is defined as the document that describes how the project will be executed, monitored, and controlled



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PROJECT CHARTER			
Project Name:	Project and Portfolio Management Test	Project Manager:	Stakeholder
Project Start Date:	May 1, 2022	Project End Date:	August 31, 2023
<b>Business Need:</b>			
The Information Technology department has identified a need for a new system that will allow them to better manage their customer service. The system will be used to track customer interactions and provide better support.			<b>Objectives:</b>
The primary objective of this project is to develop a new system that will improve customer service and satisfaction. The system will be designed to be user-friendly and easy to use.			<b>Scope:</b>
The scope of this project includes the design, development, and implementation of a new system. The system will be developed using modern technology and will be integrated with existing systems.			<b>Risks and Issues:</b>
There are several risks associated with this project, including the possibility of delays in development and the potential for cost overruns. There are also issues related to the integration of the new system with existing systems.			<b>Assumptions and Dependencies:</b>
Assumptions: The team has access to the necessary resources and expertise to complete the project successfully. Dependencies: The team will rely on the support of the IT department and other stakeholders throughout the project.			<b>Financials:</b>
Budget to complete the project is \$100,000.			Timeline:
The project is scheduled to start on May 1, 2022, and end on August 31, 2023.			Target Completion Date: August 31, 2023
Actual Date: N/A			Actual Date: N/A
<b>Project Team:</b>			
Project Manager:	Project Manager	Sponsor:	Project Manager
Project Lead:	Project Lead	Team Lead:	Team Lead
Team Members:	Team Members	Resource Lead:	Resource Lead

## PROJECT SUCCESS MEASURES

- What does success look like for this project?
- How will success be measured?
- What factors may impact success?

These project objectives may include but are not limited to

- Completing the project benefits management plan;
- Meeting the agreed-upon financial measures documented in the business case. These financial measures may include but are not limited to:
  - Net present value (NPV),
  - Return on investment (ROI),
  - Internal rate of return (IRR),
  - Payback period (PBP), and
  - Benefit-cost ratio (BCR).

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THESE PROJECT OBJECTIVES MAY INCLUDE BUT ARE NOT LIMITED TO:

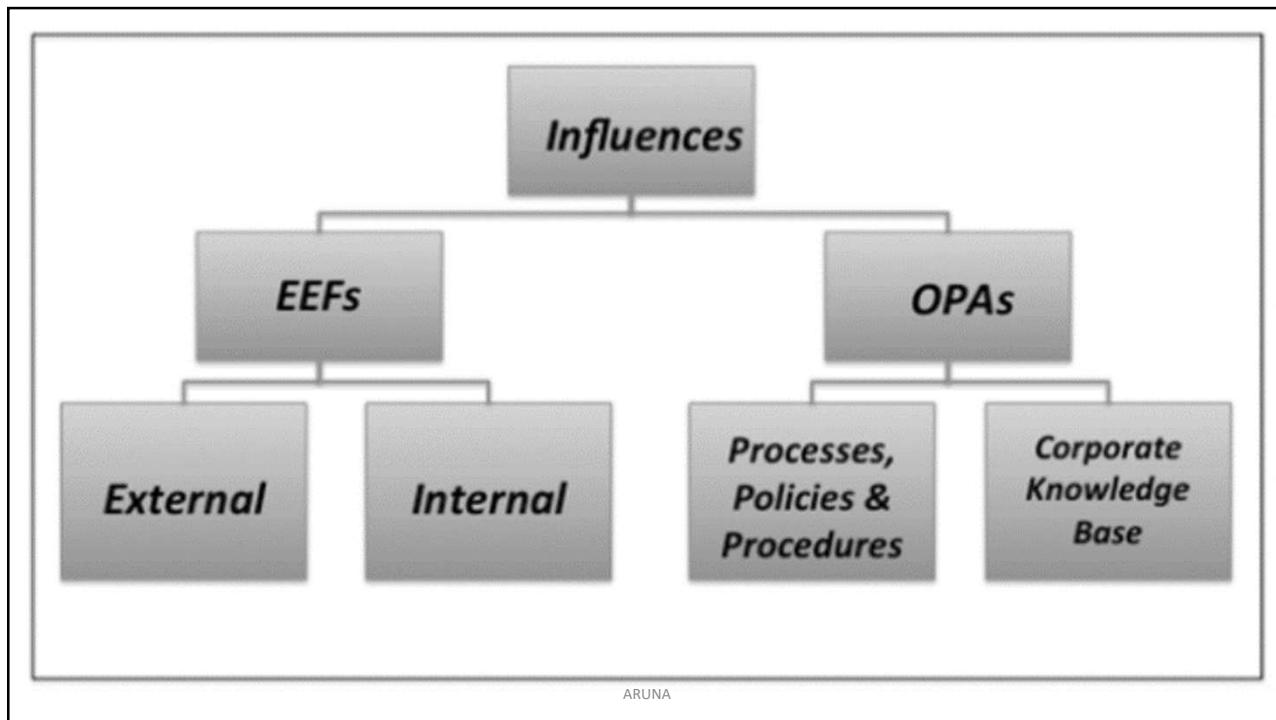
- Meeting business case nonfinancial objectives;
- Completing movement of an organization from its current state to the desired future state;
- Fulfilling contract terms and conditions;
- Meeting organizational strategy, goals, and objectives;
- Achieving stakeholder satisfaction;
- Acceptable customer/end-user adoption;
- Integration of deliverables into the organization's operating environment;
- Achieving agreed-upon quality of delivery;
- Meeting governance criteria; and
- Achieving other agreed-upon success measures or criteria (e.g., process throughput).

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## THE ENVIRONMENT IN WHICH PROJECTS OPERATE



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## EEF'S INTERNAL TO THE ORGANIZATION

- Organizational culture, structure, and governance..
- Geographic distribution of facilities and resources.
- Infrastructure.
- Information technology software.
- Resource availability.
- Employee capability.

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## EEF'S EXTERNAL TO THE ORGANIZATION

- Marketplace conditions.
- Social and cultural influences and issues
- Legal restrictions.
- Commercial databases.
- Academic research.
- Government or industry standards.
- Financial considerations.
- Physical environmental elements.

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## ORGANIZATIONAL PROCESS ASSETS

- Processes, policies, and procedures; and
- Organizational knowledge bases



## PROCESSES, POLICIES, AND PROCEDURES

### **Initiating and Planning:**

- **Guidelines and criteria** for tailoring the organization's set of standard processes and procedures to satisfy the specific needs of the project;
- **Specific organizational standards** such as policies (e.g., human resources policies, health and safety policies, security and confidentiality policies, quality policies, procurement policies, and environmental policies);
- **Product and project life cycles, and methods and procedures** (e.g., project management methods, estimation metrics, process audits, improvement targets, checklists, and standardized process definitions for use in the organization);
- **Templates** (e.g., project management plans, project documents, project registers, report formats, contract templates, risk categories, risk statement templates, probability and impact definitions, probability and impact matrices, and stakeholder register templates); and
- **Preapproved supplier lists and various types of contractual agreements** (e.g., fixed-price, cost-reimbursable, and time and material contracts).

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### **Executing, Monitoring, and Controlling:**

- **Change control procedures**, including the steps by which performing organization standards, policies, plans, and procedures or any project documents will be modified, and how any changes will be approved and validated;
- **Traceability matrices**;
- **Financial controls procedures** (e.g., time reporting, required expenditure and disbursement reviews, accounting codes, and standard contract provisions);
- **Issue and defect management procedures** (e.g., defining issue and defect controls, identifying and resolving issues and defects, and tracking action items);
- **Resource availability control and assignment management**;
- **Organizational communication requirements** (e.g., specific communication technology available, authorized communication media, record retention policies, videoconferencing, collaborative tools, and security requirements);
- **Procedures for prioritizing, approving, and issuing work authorizations**;
- **Templates** (e.g., risk register, issue log, and change log);
- **Standardized guidelines, work instructions, proposal evaluation criteria, and performance measurement criteria**; and
- **Product, service, or result verification and validation procedures**.

- **Closing.** Project closure guidelines or requirements (e.g., final project audits, project evaluations, deliverable acceptance, contract closure, resource reassignment, and knowledge transfer to production and/or operations).

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## ORGANIZATIONAL KNOWLEDGE REPOSITORIES

- **Configuration management** knowledge repositories containing the versions of software and hardware components and baselines of all performing organization standards, policies, procedures, and any project documents;
- **Financial data repositories** containing information such as labor hours, incurred costs, budgets, and any project cost overruns;
- **Historical information and lessons learned knowledge repositories** (e.g., project records and documents, all project closure information and documentation, information regarding both the results of previous project selection decisions and previous project performance information, and information from risk management activities);
- **Issue and defect management data repositories** containing issue and defect status, control information, issue and defect resolution, and action item results;
- **Data repositories for metrics** used to collect and make available measurement data on processes and products; and
- **Project files from previous projects** (e.g., scope, cost, schedule, and performance measurement baselines, project calendars, project schedule network diagrams, risk registers, risk reports, and stakeholder registers).

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## ORGANIZATIONAL SYSTEMS

- Management elements,
- Governance frameworks, and
- Organizational structure types. Systems are dynamic,
- Systems can be optimized,
- System components can be optimized,
- Systems and their components cannot be optimized at the same time, and
- Systems are nonlinear in responsiveness (a change in the input does not produce a predictable change in the output).

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## ORGANIZATIONAL GOVERNANCE FRAMEWORKS

- Includes consideration of people, roles, structures, and policies; and
- Requires providing direction and oversight through data and feedback.
- Rules,
- Policies,
- Procedures,
- Norms,
- Relationships,
- Systems, and
- Processes.

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# GOVERNANCE OF PORTFOLIOS, PROGRAMS, AND PROJECTS

## MANAGEMENT ELEMENTS

- Division of work using specialized skills and availability to perform work;
- Authority given to perform work;
- Responsibility to perform work appropriately assigned based on such attributes as skill and experience;
- Discipline of action (e.g., respect for authority, people, and rules);
- Unity of command (e.g., only one person gives orders for any action or activity to an individual);
- Unity of direction (e.g., one plan and one head for a group of activities with the same objective);
- General goals of the organization take precedence over individual goals;
- Paid fairly for work performed

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## MANAGEMENT ELEMENTS (Cont....!)

- Optimal use of resources;
- Clear communication channels;
- Right materials to the right person for the right job at the right time;
- Fair and equal treatment of people in the workplace;
- Clear security of work positions;
- Safety of people in the workplace;
- Open contribution to planning and execution by each person; and
- Optimal morale.

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## FACTORS IN ORGANIZATION STRUCTURE SELECTION

- Degree of alignment with organizational objectives,
- Specialization capabilities,
- Span of control, efficiency, and effectiveness,
- Clear path for escalation of decisions,
- Clear line and scope of authority,
- Delegation capabilities,
- Accountability assignment,
- Responsibility assignment,
- Adaptability of design,
- Simplicity of design,
- Efficiency of performance,
- Cost considerations,
- Physical locations (e.g., collocated, regional, and virtual), and
- Clear communication (e.g., policies, status of work, and organization's vision).

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Organizational Structure Type	Project Characteristics					
	Work Groups Arranged by:	Project Manager's Authority	Project Manager's Role	Resource Availability	Who Manages the Project Budget?	Project Management Administrative Staff
Organic or Simple	Flexible; people working side-by-side	Little or none	Part-time; may or may not be a designated job role like coordinator	Little or none	Owner or operator	Little or none
Functional (centralized)	Job being done (e.g., engineering, manufacturing)	Little or none	Part-time; may or may not be a designated job role like coordinator	Little or none	Functional manager	Part-time
Multidivisional (may replicate functions for each division with little centralization)	One of: product; production processes; portfolio; program; geographic region; customer type	Little or none	Part-time; may or may not be a designated job role like coordinator	Little or none	Functional manager	Part-time
Matrix—strong	By job function, with project manager as a function	Moderate to high	Full-time designated job role	Moderate to high	Project manager	Full-time
Matrix—weak	Job function	Low	Part-time; done as part of another job and not a designated job role like coordinator	Low	Functional manager	Part-time
Matrix—balanced	Job function	Low to moderate	Part-time; embedded in the functions as a skill and may or may not be a designated job role like coordinator	Low to moderate	Mixed	Part-time
Project-oriented (composite, hybrid)	Project	High to almost total	Full-time designated job role	High to almost total	Project manager	Full-time
Virtual	Network structure with nodes at points of contact with other people	Low to moderate	Full-time or part-time	Low to moderate	Mixed	Could be full-time or part-time
Hybrid	Mix of other types	Mixed	Mixed	Mixed	Mixed	Mixed
PMO	Standardized project governance	High to almost total	Full-time designated job role	High to almost total	Project manager	Full-time

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PMO refers to a portfolio, program, or project management office or organization.

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## PROJECT MANAGEMENT OFFICE

- **Supportive.** Supportive PMOs provide a consultative role to projects by supplying templates, best practices, training, access to information, and lessons learned from other projects. This type of PMO serves as a project repository. The degree of control provided by the PMO is low.
- **Controlling.** Controlling PMOs provide support and require compliance through various means. The degree of control provided by the PMO is moderate. Compliance may involve:
  - Adoption of project management frameworks or methodologies;
  - Use of specific templates, forms, and tools; and
  - Conformance to governance frameworks.
- **Directive.** Directive PMOs take control of the projects by directly managing the projects.

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## PMO MAY :

- Make recommendations,
- Lead knowledge transfer,
- Terminate projects, and
- Take other actions, as required.



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## PRIMARY FUNCTION OF A PMO

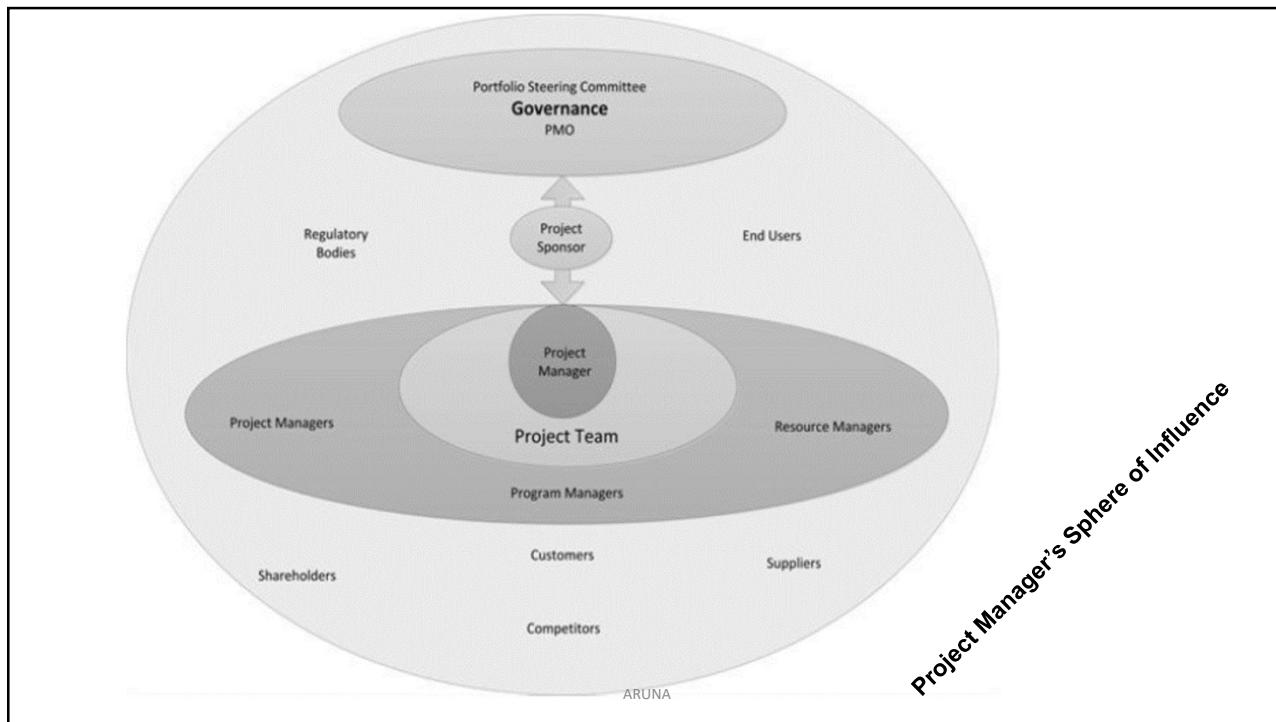
- Managing shared resources across all projects administered by the PMO;
- Identifying and developing project management methodology, best practices, and standards;
- Coaching, mentoring, training, and oversight;
- Monitoring compliance with project management standards, policies, procedures, and templates by means of project audits;
- Developing and managing project policies, procedures, templates, and other shared documentation (organizational process assets); and
- Coordinating communication across projects

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## ROLE OF THE PROJECT MANAGER

- **Membership and roles**
- **Responsibility for team.**
- **Knowledge and skills**
  - The conductor is not expected to be able to play every instrument in the orchestra, but should possess musical knowledge, understanding, and experience
  - The project manager is not expected to perform every role on the project, but should possess project management knowledge, technical knowledge, understanding, and experience

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The ability to communicate with stakeholders, including the team and sponsors applies across multiple aspects of the project including, but not limited to, the following:

- Developing finely tuned skills using multiple methods (e.g., verbal, written, and nonverbal);
- Creating, maintaining, and adhering to communications plans and schedules;
- Communicating predictably and consistently;
- Seeking to understand the project stakeholders' communication needs (communication may be the only deliverable that some stakeholders received until the project's end product or service is completed);
- Making communications concise, clear, complete, simple, relevant, and tailored;
- Including important positive and negative news;
- Incorporating feedback channels; and
- Relationship skills involving the development of extensive networks of people throughout the project manager's spheres of influence

**The project manager proactively interacts with other project managers. Other independent projects or projects that are part of the same program may impact a project due to but not limited to the following:**

- Demands on the same resources,
- Priorities of funding,
- Receipt or distribution of deliverables, and
- Alignment of project goals and objectives with those of the organization

**The project manager also works to:**

- Demonstrate the value of project management,
- Increase acceptance of project management in the organization, and
- Advance the efficacy of the PMO when one exists in the organization

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**The project manager stays informed about current industry trends. The project manager takes this information and sees how it may impact or apply to the current projects. These trends include but are not limited to:**

- Product and technology development
- New and changing market niches
- Standards (e.g., project management, quality management, information security management)
- Technical support tools
- Economic forces that impact the immediate project
- Influences affecting the project management discipline and
- Process improvement and sustainability strategies

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## PMI TALENT TRANGLE



- **Technical Project Management**

*▲Knowledge, skills and behaviors related to specific domains of project, program and portfolio management*

- **Leadership**

*▲Knowledge, skills and behaviors specific to leadership-oriented; cross-cutting skills that help an organization achieve its business goals*

- **Strategic and Business Management**

*▲Knowledge of and expertise in the industry or organization that enhances performance and better delivers business outcomes*

## PROJECT MANAGER COMPETENCES

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## TECHNICAL PROJECT MANAGEMENT SKILLS

- Focus on the critical technical project management elements for each project they manage.
- This focus is as simple as having the right artifacts readily available. At the top of the list were the following:
  - Critical success factors for the project,
  - Schedule,
  - Selected financial reports, and
  - Issue log.
- Tailor both traditional and agile tools, techniques, and methods for each project.
- Make time to plan thoroughly and prioritize diligently.
- Manage project elements, including, but not limited to, schedule, cost, resources, and risks

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## STRATEGIC AND BUSINESS MANAGEMENT SKILLS

- Explain to others the essential business aspects of a project;
- Work with the project sponsor, team, and subject matter experts to develop an appropriate project delivery strategy; and
- Implement that strategy in a way that maximizes the business value of the project Strategy;
- Mission;
- Goals and objectives;
- Products and services;
- Operations (e.g., location, type, technology);
- The market and the market condition, such as customers, state of the market (i.e., growing or shrinking), and time-to-market factors, etc.; and
- Competition (e.g., what, who, position in the market place).

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## LEADERSHIP SKILLS

- Being a visionary (e.g., help to describe the products, goals, and objectives of the project; able to dream and translate those dreams for others);
- Being optimistic and positive;
- Being collaborative;
- Managing relationships and conflict by:
  - Building trust;
  - Satisfying concerns;
  - Seeking consensus;
  - Balancing competing and opposing goals;
  - Applying persuasion, negotiation, compromise, and conflict resolution skills;
  - Developing and nurturing personal and professional networks;
  - Taking a long-term view that relationships are just as important as the project; and
  - Continuously developing and applying political acumen.

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## LEADERSHIP SKILLS

- Communicating by:
  - Spending sufficient time communicating (research shows that top project managers spend about 90% of their time on a project in communicating);
  - Managing expectations;
  - Accepting feedback graciously;
  - Giving feedback constructively; and
  - Asking and listening.
- Being respectful (helping others retain their autonomy), courteous, friendly, kind, honest, trustworthy, loyal, and ethical;
- Exhibiting integrity and being culturally sensitive, courageous, a problem solver, and decisive;
- Giving credit to others where due;
- Being a life-long learner who is results- and action-oriented;

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## LEADERSHIP SKILLS

- Focusing on the important things, including:
  - Continuously prioritizing work by reviewing and adjusting as necessary;
  - Finding and using a prioritization method that works for them and the project;
  - Differentiating high-level strategic priorities, especially those related to critical success factors for the project;
  - Maintaining vigilance on primary project constraints;
  - Remaining flexible on tactical priorities; and
  - Being able to sift through massive amounts of information to obtain the most important information.
- Having a holistic and systemic view of the project, taking into account internal and external factors equally;
- Being able to apply critical thinking (e.g., application of analytical methods to reach decisions) and identify him or herself as a change agent.
- Being able to build effective teams, be service-oriented, and have fun and share humor effectively with team members.

# LEADERSHIP SKILLS

- POLITICS, POWER, AND GETTING THINGS DONE

- Positional (sometimes called formal, authoritative, legitimate) (e.g., formal position granted in the organization or team);
- Informational (e.g., control of gathering or distribution);
- Referent (e.g., respect or admiration others hold for the individual, credibility gained);
- Situational (e.g., gained due to unique situation such as a specific crisis);
- Personal or charismatic (e.g., charm, attraction);
- Relational (e.g., participates in networking, connections, and alliances);
- Expert (e.g., skill, information possessed; experience, training, education, certification);
- Reward-oriented (e.g., ability to give praise, monetary or other desired items);

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# LEADERSHIP SKILLS

- POLITICS, POWER, AND GETTING THINGS DONE

- Punitive or coercive (e.g., ability to invoke discipline or negative consequences);
- Ingratiating (e.g., application of flattery or other common ground to win favor or cooperation);
- Pressure-based (e.g., limit freedom of choice or movement for the purpose of gaining compliance to desired action);
- Guilt-based (e.g., imposition of obligation or sense of duty);
- Persuasive (e.g., ability to provide arguments that move people to a desired course of action); and
- Avoiding (e.g., refusing to participate).

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## COMPARISON OF LEADERSHIP AND MANAGEMENT

Management	Leadership
Direct using positional power	Guide, influence, and collaborate using relational power
Maintain	Develop
Administrate	Innovate
Focus on systems and structure	Focus on relationships with people
Rely on control	Inspire trust
Focus on near-term goals	Focus on long-range vision
Ask how and when	Ask what and why
Focus on bottom line	Focus on the horizon
Accept status quo	Challenge status quo
Do things right	Do the right things
Focus on operational issues and problem solving	Focus on vision, alignment, motivation, and inspiration

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## LEADERSHIP STYLES

- **Laissez-faire** (e.g., allowing the team to make their own decisions and establish their own goals, also referred to as taking a hands-off style);
- **Transactional** (e.g., focus on goals, feedback, and accomplishment to determine rewards; management by exception);
- **Servant leader** (e.g., demonstrates commitment to serve and put other people first; focuses on other people's growth, learning, development, autonomy, and well-being; concentrates on relationships, community and collaboration; leadership is secondary and emerges after service);
- **Transformational** (e.g., empowering followers through idealized attributes and behaviors, inspirational motivation, encouragement for innovation and creativity, and individual consideration);
- **Charismatic** (e.g., able to inspire; is high-energy, enthusiastic, self-confident; holds strong convictions); and
- **Interactional** (e.g., a combination of transactional, transformational, and charismatic

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## PERSONALITY

- **Authentic** (e.g., accepts others for what and who they are, show open concern);
- **Courteous** (e.g., ability to apply appropriate behavior and etiquette);
- **Creative** (e.g., ability to think abstractly, to see things differently, to innovate);
- **Cultural** (e.g., measure of sensitivity to other cultures including values, norms, and beliefs);
- **Emotional** (e.g., ability to perceive emotions and the information they present and to manage them; measure of interpersonal skills);
- **Intellectual** (e.g., measure of human intelligence over multiple aptitudes);
- **Managerial** (e.g., measure of management practice and potential);
- **Political** (e.g., measure of political intelligence and making things happen);
- **Service-oriented** (e.g., evidence of willingness to serve other people);
- **Social** (e.g., ability to understand and manage people); and
- **Systemic** (e.g., drive to understand and build systems).

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## PERFORMING INTEGRATION

The role of the project manager is twofold when performing integration on the project:

- Project managers play a key role in working with the project sponsor to understand the strategic objectives
- Ensure the alignment of the project objectives and results with those of the portfolio, program, and business areas.
- Project managers contribute to the integration and execution of the strategy.
- Project managers are responsible for guiding the team to work together to focus on what is really essential at the project level.
- This is achieved through the integration of processes, knowledge, and people.

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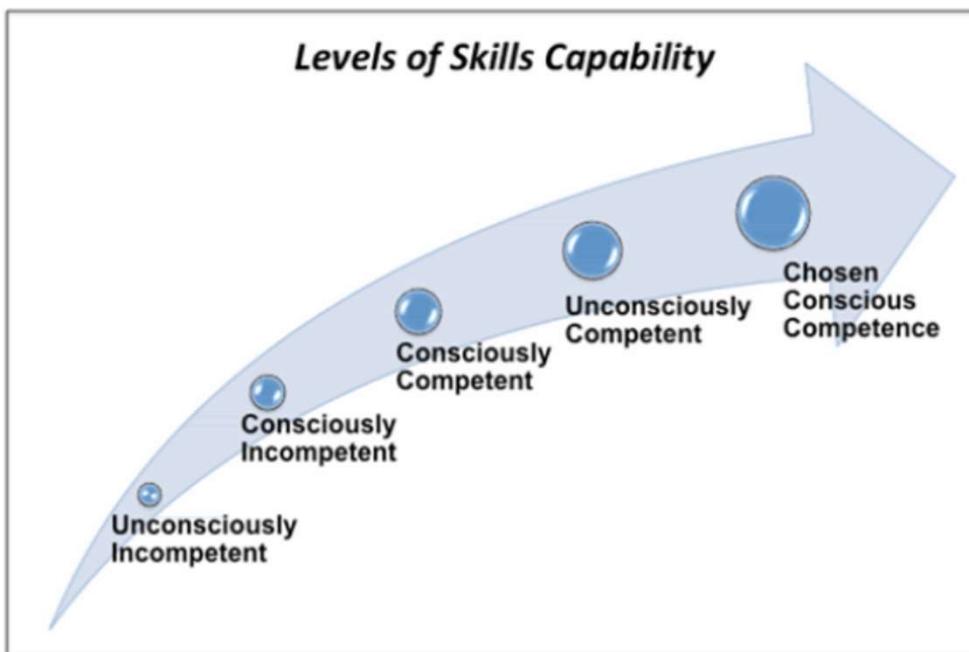
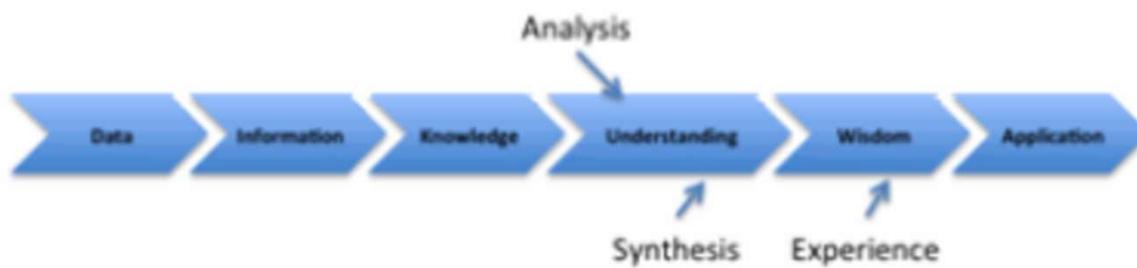


Figure 3-3. Levels of Skills Capability

## *Skills Development*



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Management	Leadership
Direct using positional power	Guide, influence, and collaborate using relational power
Maintain	Develop
Administrate	Innovate
Focus on systems and structure	Focus on relationships with people
Rely on control	Inspire trust
Focus on near-term goals	Focus on long-range vision
Ask how and when	Ask what and why
Focus on the bottom line	Focus on the horizon
Accepts status quo	Challenges status quo
Does things right	Does the right things
Focus on operational issues and problem solving	Focus on vision, alignment, motivation, and inspiration

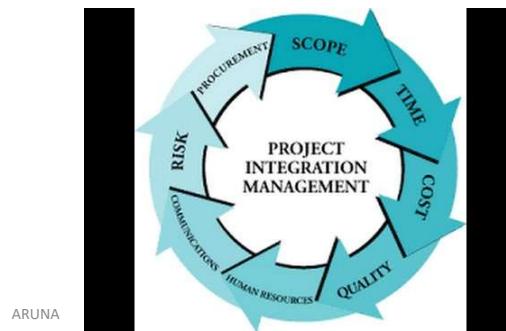
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## PROJECT INTEGRATION MANAGEMENT "PUTTING THE PIECES TOGETHER"



## PROJECT INTEGRATION MANAGEMENT

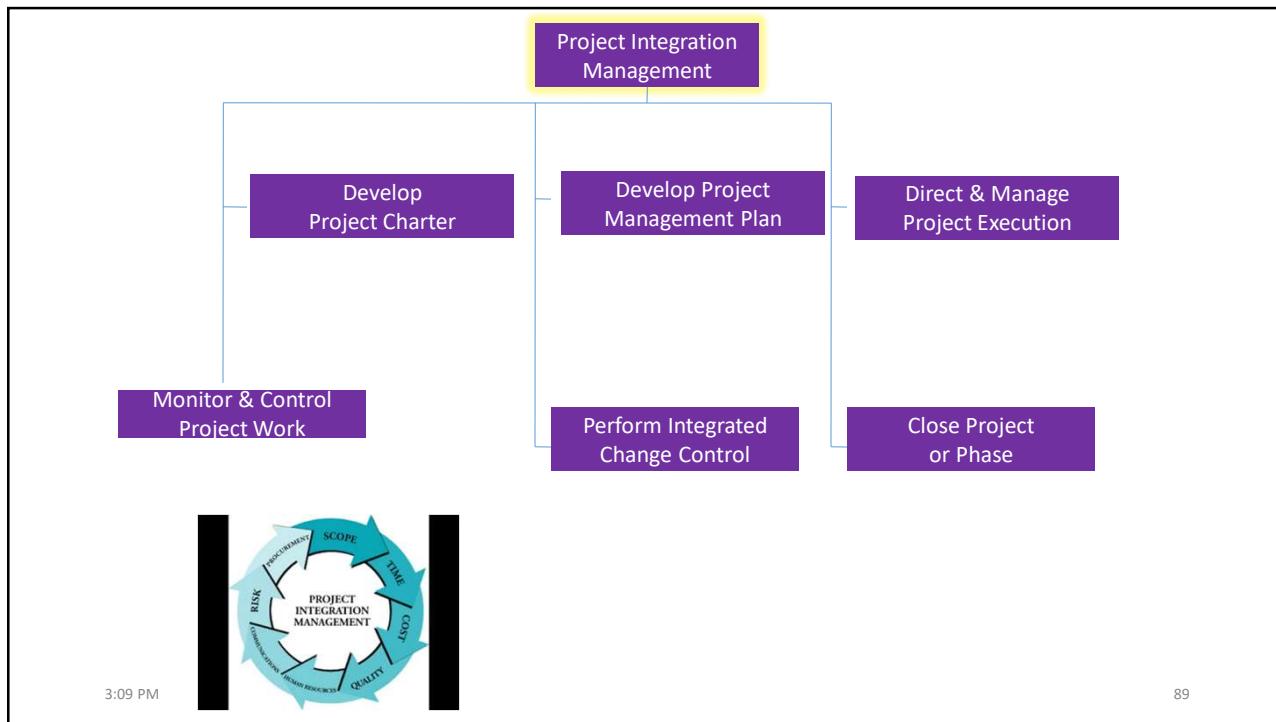
- Resource allocation,
- Balancing competing demands,
- Examining any alternative approaches,
- Tailoring the processes to meet the project objectives, and
- Managing the interdependencies among the Project Management Knowledge Areas



## PROJECT INTEGRATION MANAGEMENT

- **Develop Project Charter**—The process of developing a document that formally authorizes the existence of a project and provides the project manager with the authority to apply organizational resources to project activities.
- **Develop Project Management Plan**—The process of defining, preparing, and coordinating all plan components and consolidating them into an integrated project management plan.
- **Direct and Manage Project Work**—The process of leading and performing the work defined in the project management plan and implementing approved changes to achieve the project's objectives.
- **Manage Project Knowledge**—The process of using existing knowledge and creating new knowledge to achieve the project's objectives and contribute to organizational learning.
- **Monitor and Control Project Work**—The process of tracking, reviewing, and reporting overall progress to meet the performance objectives defined in the project management plan.
- **Perform Integrated Change Control**—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.

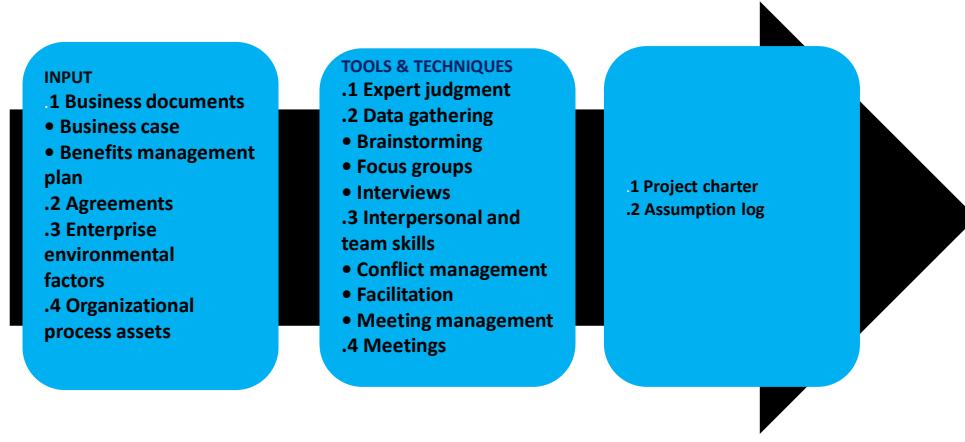
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## KEY CONCEPTS FOR PROJECT INTEGRATION MANAGEMENT

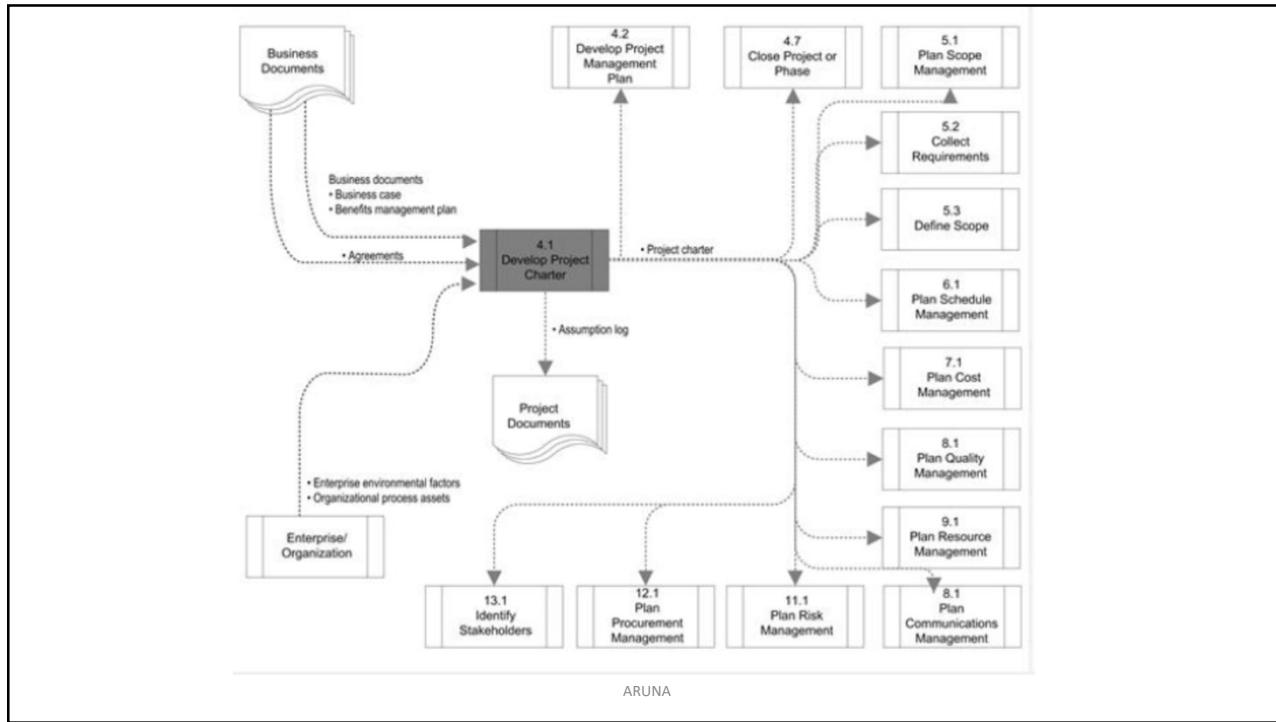
- Ensuring that the deliverable due dates of the product, service, or result; project life cycle; and the benefitsmanagement plan are aligned;
- Providing a project management plan to achieve the project objectives;
- Ensuring the creation and the use of the appropriate knowledge to and from the project as necessary;
- Managing the performance and changes of the activities in the project management plan;
- 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 the data 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;and
- Managing phase transitions when necessary.

# DEVELOP PROJECT CHARTER



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## DEVELOP PROJECT CHARTER: INPUTS - BUSINESS DOCUMENTS

- **Business case.** The approved business case, or similar, is the business document most commonly used to create the project charter
  - **Market demand** (e.g., an automobile manufacturer authorizing a project to build more fuel-efficient cars in response to gasoline shortages),
  - **Organizational need** (e.g., due to high overhead costs, a company may combine staff functions and streamline processes to reduce costs),
  - **Customer request** (e.g., an electric utility authorizing a project to build a new substation to serve a new industrial park),
  - **Technological advance** (e.g., an airline authorizing a new project to develop electronic tickets instead of paper tickets based on technological advances),
  - **Legal requirement** (e.g., a paint manufacturer authorizing a project to establish guidelines for handling toxic materials),
  - **Ecological impacts** (e.g., a company authorizing a project to lessen its environmental impact), or **Social need** (e.g., a nongovernmental organization in a developing country authorizing a project to provide potable water systems, latrines, and sanitation education to communities suffering from high rates of cholera).

## DEVELOP PROJECT CHARTER: INPUTS – AGREEMENTS, ENTERPRISE ENVIRONMENTAL FACTORS

- Government or industry standards (e.g., product standards, quality standards, safety standards, and workmanship 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), and
- Stakeholders' expectations and risk thresholds.

## 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 (e.g., project charter template); and
- Historical information and lessons learned repository (e.g., project records and documents, information about the results of previous project selection decisions, and information about previous project performance).

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## DEVELOP PROJECT CHARTER: TOOLS AND TECHNIQUES

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

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- **DATA GATHERING**

- **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
- **Focus groups.** 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.** 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.



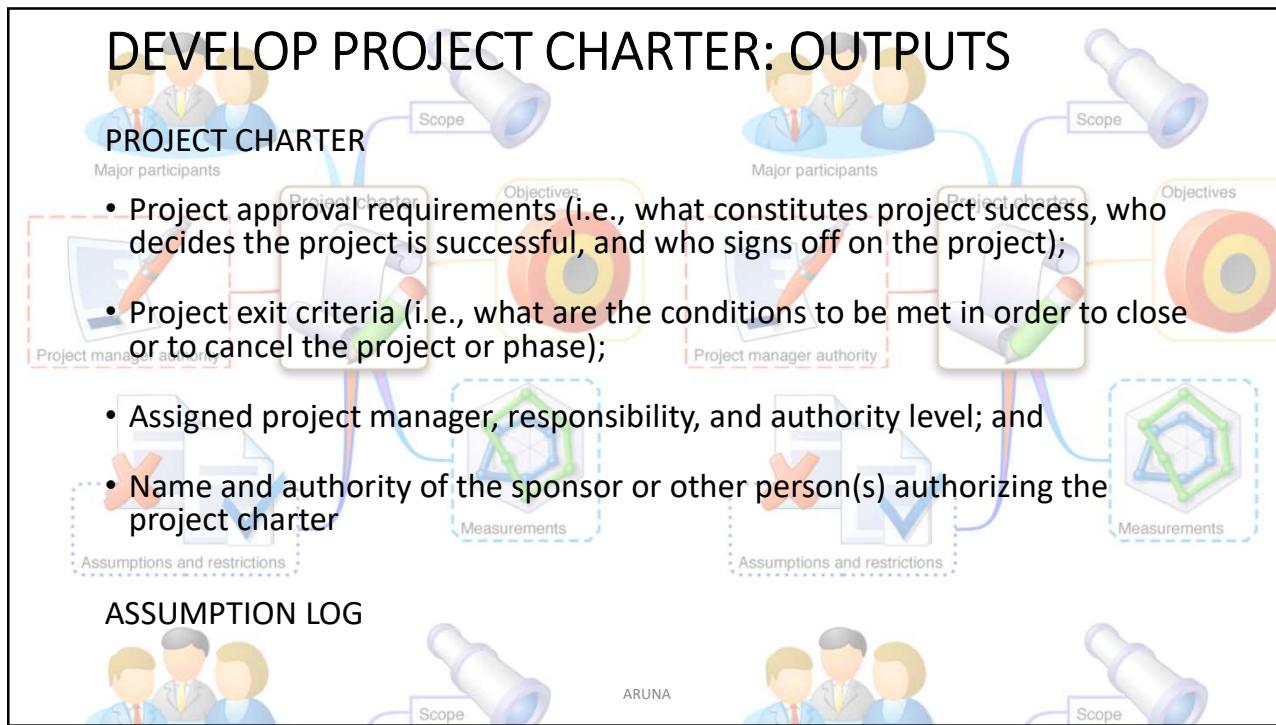
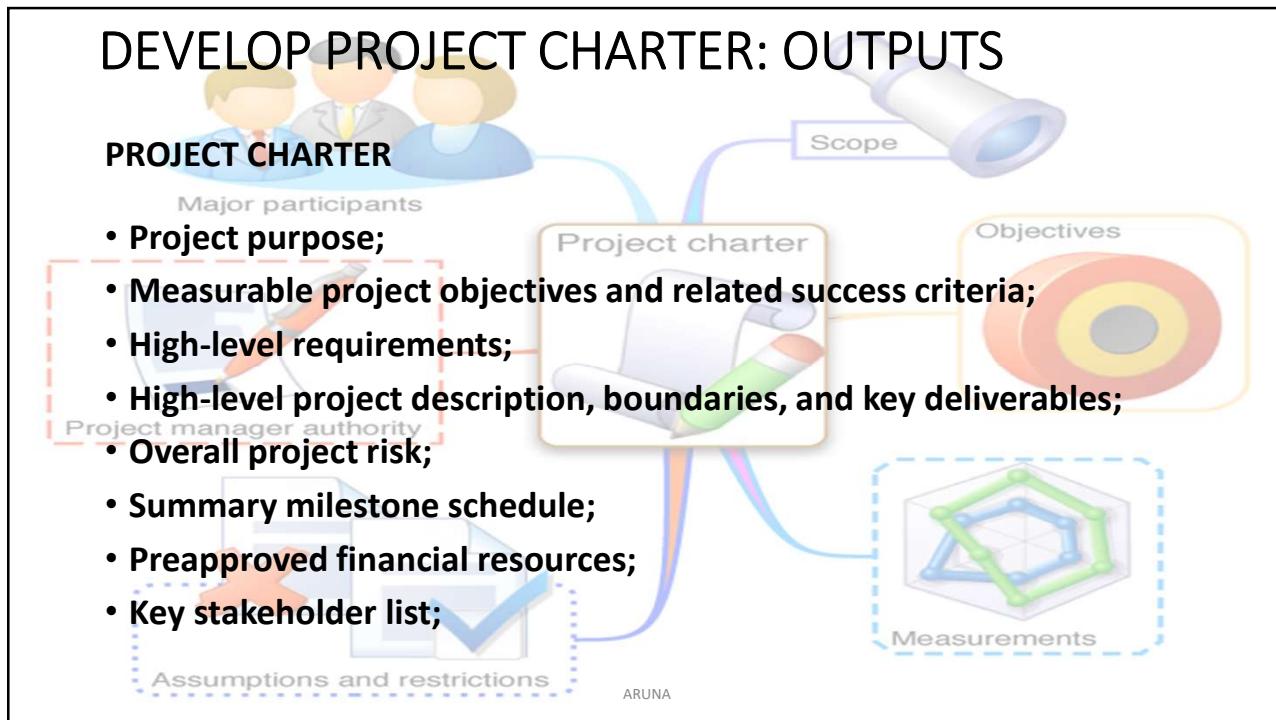
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## INTERPERSONAL AND TEAM SKILLS

- **Conflict management.** Conflict management can be used to help bring stakeholders into alignment on the objectives, success criteria, high-level requirements, project description, summary milestones, and other elements of the charter.
- **Facilitation.** Facilitation is the ability to effectively guide a group event to a successful decision, solution, or conclusion.
- **Meeting management.** Meeting management 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.



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# DEVELOP PROJECT MANAGEMENT PLAN

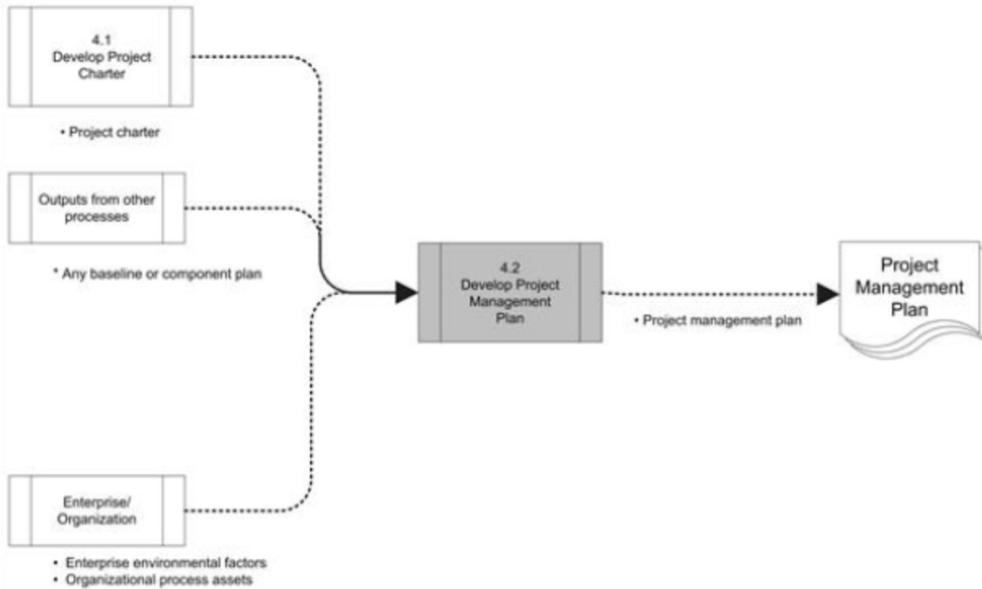
- INPUTS**
- Project Charter
  - Outputs from other processes
  - Enterprise environmental factors
  - Organizational process assets

- TOOLS & TECHNIQUES**
- .1 Expert judgment
  - .2 Data gathering
    - Brainstorming
    - Checklists
    - Focus groups
    - Interviews
  - .3 Interpersonal and team skills
    - Conflict management
    - Facilitation
    - Meeting management
  - .4 Meetings

- OUTPUTS**
- Project Management Plan

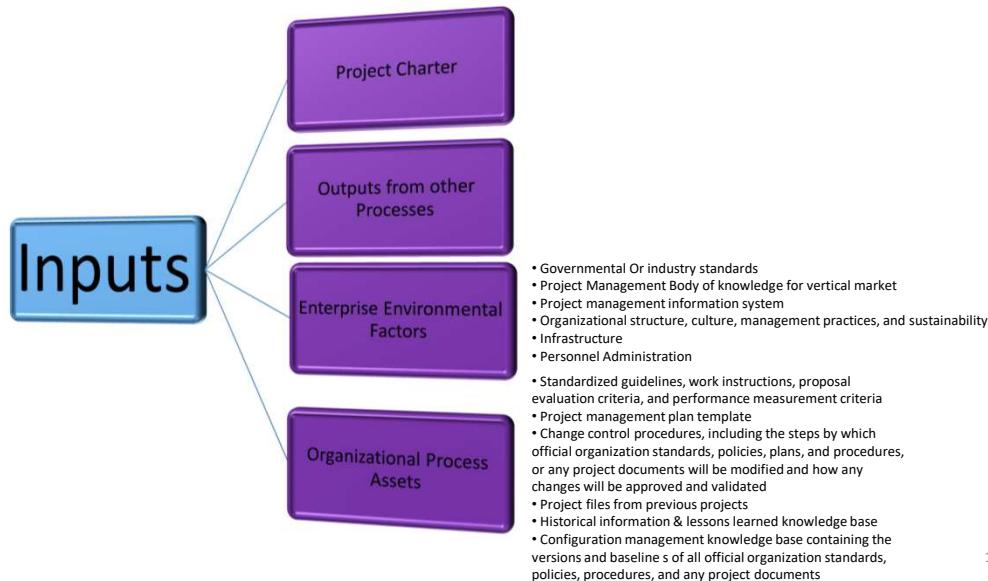
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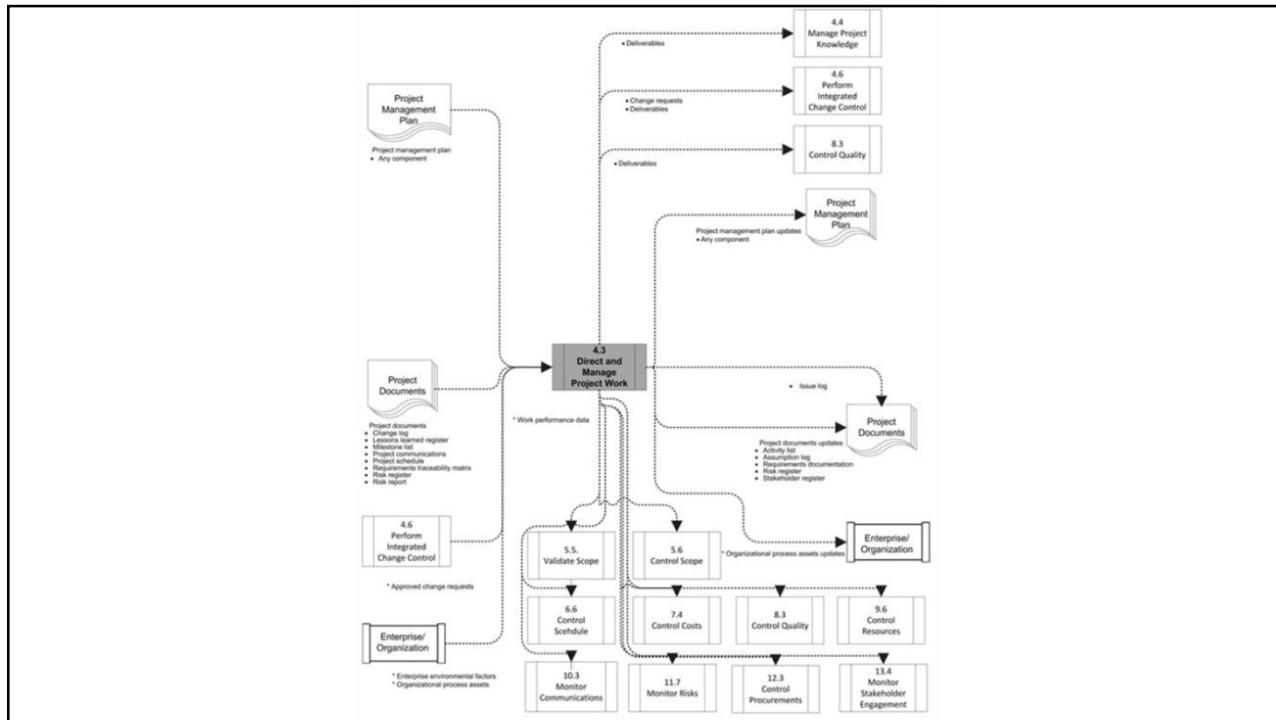
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## DEVELOP PROJECT MANAGEMENT PLAN: INPUTS

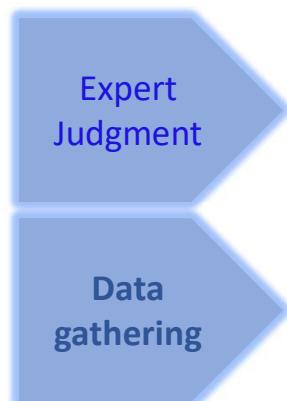


Project Management Plan		Project Documents
1. Scope management plan 2. Requirements management plan 3. Schedule management plan 4. Cost management plan 5. Quality management plan 6. Resource management plan 7. Communications management plan 8. Risk management plan 9. Procurement management plan 10. Stakeholder engagement plan 11. Change management plan 12. Configuration management plan 13. Benefits management plan 14. Scope baseline 15. Schedule baseline 16. Cost baseline 17. Performance measurement baseline 18. Project life cycle description	1. Activity attributes 2. Activity list 3. Assumption log 4. Basis of estimates 5. Change log 6. Cost forecasts 7. Duration estimates 8. Issue log 9. Lessons learned register 10. Milestone list 11. Project calendars 12. Project communications 13. Project schedule 14. Project schedule network diagram 15. Project staff assignments 16. Quality control measurements 17. Quality metrics 18. Quality report	19. Requirements documentation 20. Requirements traceability matrix 21. Resource assignments 22. Resource breakdown structure 23. Resource calendars 24. Resource requirements 25. Risk register 26. Risk report 27. Schedule data 28. Schedule forecasts 29. Source selection criteria 30. Stakeholder register 31. Team appraisals 32. Team charter 33. Test and evaluation documents

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## Develop Project Management Plan: Tools & Techniques



- Tailoring the project management process to meet the project needs, including the dependencies and interactions among those processes and the essential inputs and outputs;
- Developing additional components of the project management plan if needed;
- Determining the tools and techniques to be used for accomplishing those processes;
- Developing technical and management details to be included in the project management plan;
- Determining resources and skill levels needed to perform project work;
- Defining the level of configuration management to apply on the project;
- Determining which project documents will be subject to the formal change control process; and
- Prioritizing the work on the project to ensure the project resources are allocated to the appropriate work at the appropriate time.
- **Brainstorming.** Brainstorming is frequently used when developing the project management plan to gather ideas and solutions about the project approach. Many organizations have standardized checklists available based in their own experience or use checklists from the industry.
- **Focus groups Interviews.** Focus groups bring together stakeholders to discuss the project management approach and the integration of the different components of the project management plan.
- **Interviews** are used to obtain specific information from stakeholders to develop the project management plan or any component plan or project document.

## Develop Project Management Plan: Tools & Techniques



**Conflict management** Conflict management may be necessary to bring diverse stakeholders into alignment on all aspects of the project management plan.

**Facilitation** Facilitation ensures that there is effective participation, that participants achieve a mutual understanding, that all contributions are considered, and that conclusions or results have full buy-in according to the decision process established for the project.

**Meeting management.** Described in Section 10.2.2.6. Meeting management is necessary to ensure that the numerous meetings that are necessary to develop, unify, and agree on the project management plan are well run

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## Develop Project Plan: Outputs



- Baseline
  - scope baseline
  - schedule baseline
  - cost baseline
- Subsidiary Plans
- Additional Plans

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## DIRECT & MANAGE PROJECT WORK

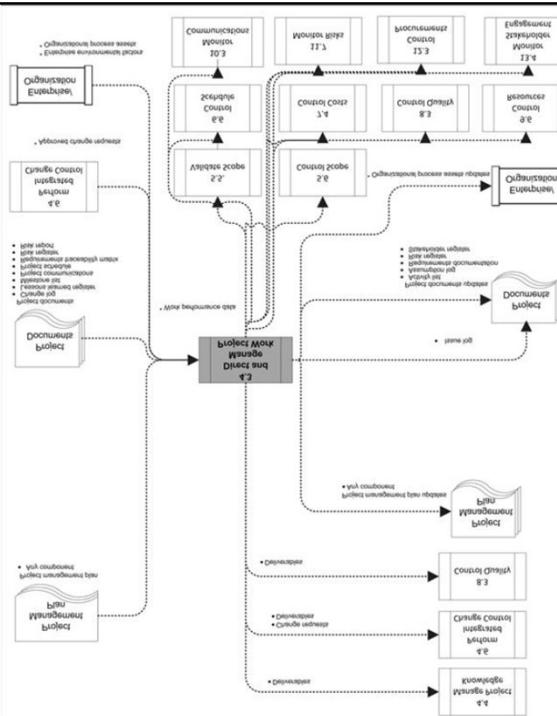
- INPUTS**
- Project management plan
  - Any component
  - Project documents
  - Change log
  - Lessons learned register
  - Milestone list
  - Project communications
  - Project schedule
  - Requirements traceability matrix
  - Risk register
  - Risk report
  - Approved change requests
  - Enterprise environmental factors
  - 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 Project management plan updates
  - Any component
  - .6 Project documents updates
  - Activity list
  - Assumption log
  - Lessons learned register
  - Requirements documentation
  - Risk register
  - Stakeholder register
  - .7 Organizational process assets updates

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## DIRECT AND MANAGE PROJECT WORK: INPUTS

- **PROJECT MANAGEMENT PLAN**
- **PROJECT DOCUMENTS**
  - Change log.
  - Lessons learned register.
  - Milestone list.
  - Project communications.
  - Project schedule.
  - Requirements traceability matrix.
  - Risk register.
  - Risk report.



- APPROVED CHANGE REQUESTS
- ENTERPRISE ENVIRONMENTAL FACTORS
- ORGANIZATIONAL PROCESS ASSETS
  - Organizational standard policies, processes, and procedures;
  - Issue and defect management procedures defining issue and defect controls, issue and defect identification and resolution, and action item tracking;
  - Issue and defect management database(s) containing historical issue and defect status, issue and defect resolution, and action item results;
  - Performance measurement database used to collect and make available measurement data on processes and products;
  - Change control and risk control procedures; and
  - Project information from previous projects (e.g., scope, cost, schedule, performance measurement baselines, project calendars, project schedule network diagrams, risk registers, risk reports, and lessons learned repository).

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## DIRECT AND MANAGE PROJECT WORK: TOOLS AND TECHNIQUES

- **EXPERT JUDGMENT**

- Technical knowledge on the industry and focus area of the project,
- Cost and budget management,
- Legal and procurement,
- Legislation and regulations, and
- Organizational governance.

- **PROJECT MANAGEMENT INFORMATION SYSTEM (PMIS)**

- **MEETINGS**

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## DIRECT AND MANAGE PROJECT WORK: OUTPUTS

- **DELIVERABLES**
- **WORK PERFORMANCE DATA**
- **ISSUE LOG**
- Issue type,
  - Who raised the issue and when,
  - Description,
  - Priority,
  - Who is assigned to the issue,
  - Target resolution date,
  - Status, and
  - Final solution.

ARUNA

- CHANGE REQUESTS
  - Corrective action.
  - Preventive action.
  - Defect repair.
  - Updates.
- PROJECT MANAGEMENT PLAN UPDATES
- PROJECT DOCUMENTS UPDATES
  - Activity list.
  - Assumption log.
  - Lessons learned register.
  - Requirements documentation.
  - Risk register.
  - Stakeholder register
- ORGANIZATIONAL PROCESS ASSETS UPDATES

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## Direct & Manage Project Work

### INPUTS

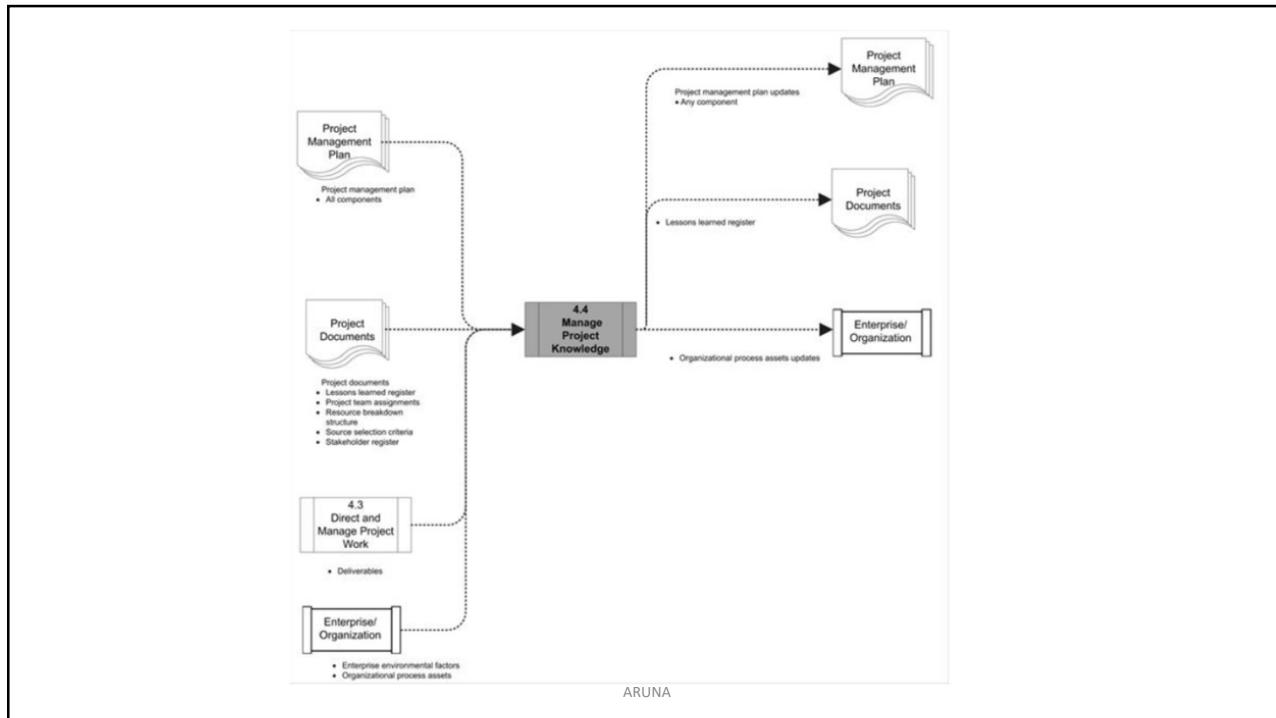
- .1 Project management plan
  - All components
  - Project documents
  - Lessons learned register
  - Project team assignments
  - Resource breakdown structure
  - Source selection criteria
  - Stakeholder register
- .3 Deliverables
- .4 Enterprise environmental factors
- .5 Organizational process assets

### 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 Project management plan updates
  - Any component
- .3 Organizational process assets



## MANAGE PROJECT KNOWLEDGE: INPUTS

- PROJECT MANAGEMENT PLAN
- PROJECT DOCUMENTS
  - Lessons learned register.
  - Project team assignments
  - Resource breakdown structure.
  - Stakeholder register.
- DELIVERABLES
- ENTERPRISE ENVIRONMENTAL FACTORS
  - Organizational, stakeholder, and customer culture
  - Geographic distribution of facilities and resources
  - Organizational knowledge experts
  - Legal and regulatory requirements and/or constraints

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- ORGANIZATIONAL PROCESS ASSETS
  - Organizational standard policies, processes, and procedures
  - Personnel administration
  - Organizational communication requirements
  - Formal knowledge-sharing and information-sharing procedures



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## MANAGE PROJECT KNOWLEDGE: TOOLS AND TECHNIQUES

- EXPERT JUDGMENT
  - Knowledge management,
  - Information management,
  - Organizational learning,
  - Knowledge and information management tools, and
  - Relevant information from other projects
- KNOWLEDGE MANAGEMENT
  - Networking
  - Communities of practice
  - Meetings, including virtual meetings where participants can interact using communications technology

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- **KNOWLEDGE MANAGEMENT (Continued .....!)**

- 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; and
- Training that involves interaction between learners.



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- **INFORMATION MANAGEMENT**

- 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; and
- Project management information system (PMIS).

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- INTERPERSONAL AND TEAM SKILLS

- Active listening
- Facilitation
- Leadership
- Networking
- Political awareness



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## MANAGE PROJECT KNOWLEDGE: OUTPUTS

- LESSONS LEARNED REGISTER
- PROJECT MANAGEMENT PLAN UPDATES
- ORGANIZATIONAL PROCESS ASSETS UPDATES



## MONITOR AND CONTROL PROJECT WORK

**INPUTS**

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

**TOOLS & TECHNIQUES**

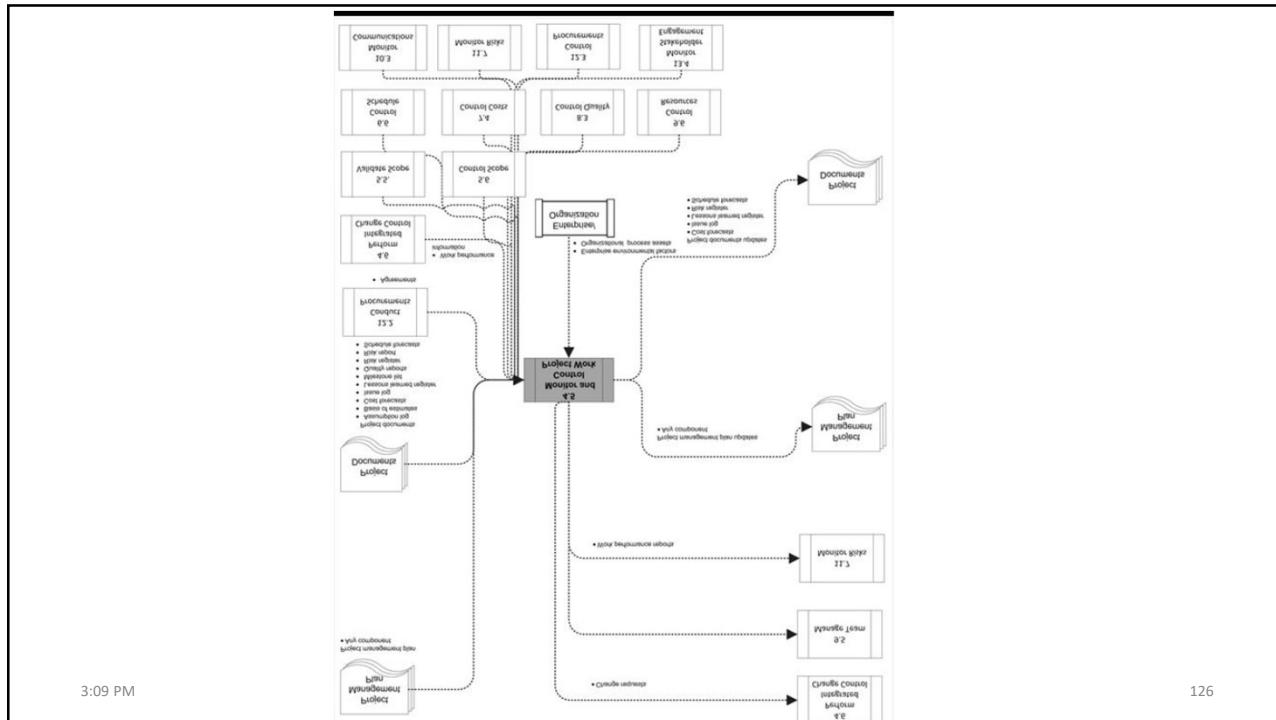
- .1 Expert judgment
- .2 Data analysis
  - Alternatives analysis
  - Cost-benefit analysis
  - Earned value analysis
  - Root cause analysis
  - Trend analysis
  - Variance analysis
- .3 Decision making
- .4 Meetings

**OUTPUTS**

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

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## MONITOR AND CONTROL PROJECT WORK

- Comparing actual project performance against the project management plan;
- Assessing performance periodically to determine whether any corrective or preventive actions are indicated, and then recommending those actions as necessary;
- Checking the status of individual project risks;
- Maintaining an accurate, timely information base concerning the project's product(s) and their associated documentation through project completion;
- Providing information to support status reporting, progress measurement, and forecasting;
- Providing forecasts to update current cost and current schedule information;
- Monitoring implementation of approved changes as they occur;
- Providing appropriate reporting on project progress and status to program management when the project is part of an overall program; and
- Ensuring that the project stays aligned with the business needs.

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## MONITOR AND CONTROL PROJECT WORK: INPUTS

- PROJECT MANAGEMENT PLAN
- PROJECT DOCUMENTS
  - Assumption log
  - Basis of estimates
  - Cost forecasts
  - Issue log
  - Lessons learned register
  - Milestone list
  - Quality reports
  - Risk register
  - Risk report
  - Schedule forecasts



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- WORK PERFORMANCE INFORMATION
- AGREEMENTS
- ENTERPRISE ENVIRONMENTAL FACTORS

- Project management information systems such as scheduling, cost, resourcing tools, performance indicators, databases, project records, and financials;
- Infrastructure (e.g., existing facilities and equipment, organization's telecommunications channels);
- Stakeholders' expectations and risk thresholds; and
- Government or industry standards (e.g., regulatory agency regulations, product standards, quality standards, and workmanship standards)

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- ORGANIZATIONAL PROCESS ASSETS

- Organizational standard policies, processes, and procedures;
- Financial controls procedures (e.g., required expenditure and disbursement reviews, accounting codes, and standard contract provisions);
- Monitoring and reporting methods;
- Issue management procedures defining issue controls, issue identification, and resolution and action item tracking;
- Defect management procedures defining defect controls, defect identification, and resolution and action item tracking; and
- Organizational knowledge base, in particular process measurement and the lessons learned repository

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## MONITOR AND CONTROL PROJECT WORK: TOOLS AND TECHNIQUES

- EXPERT JUDGMENT

- Earned value analysis,
- Interpretation and contextualization of data,
- Techniques to estimate duration and costs,
- Trend analysis,
- Technical knowledge on the industry and focus area of the project,
- Risk management, and
- Contract management

- DATA ANALYSIS

- Alternatives analysis.
- Cost-benefit analysis
- Earned value analysis.
- Root cause analysis
- Trend analysis
- Variance analysis

- DECISION MAKING

- MEETINGS

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## MONITOR AND CONTROL PROJECT WORK: OUTPUTS

- WORK PERFORMANCE REPORTS
- CHANGE REQUESTS
  - Corrective action.
  - Preventive action
  - Defect repair
- PROJECT MANAGEMENT PLAN UPDATES
- PROJECT DOCUMENTS UPDATES

- PROJECT DOCUMENTS UPDATES
  - Cost forecasts
  - Issue log
  - Lessons learned register
  - Risk register
  - Schedule forecasts

## Perform Integrated Change Control

### INPUTS

- .1 Project management plan
  - Change management plan
  - Configuration management plan
  - Scope baseline
  - Schedule baseline
  - Cost baseline
- .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
  - Alternatives analysis
  - Cost-benefit analysis
  - Decision making
- .4 Voting
- .5 Autocratic decision making
- .6 Multicriteria decision analysis
- .7 Meetings

### OUTPUTS

- .1 Approved change requests
- .2 Project management plan updates
  - Any component
- .3 Project documents updates
- .4 Change log

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## PERFORM INTEGRATED CHANGE CONTROL: INPUTS

- **PROJECT MANAGEMENT PLAN**
  - Change management plan
  - Configuration management plan
  - Scope baseline
  - Schedule baseline
  - Cost baseline
- **PROJECT DOCUMENTS**
  - Basis of estimates
  - Requirements traceability matrix
  - Risk report

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- **PROJECT MANAGEMENT PLAN**
  - Change management plan
  - Configuration management plan
  - Scope baseline
  - Schedule baseline
  - Cost baseline
- **PROJECT DOCUMENTS**
  - Basis of estimates
  - Requirements traceability matrix
  - Risk report
- **WORK PERFORMANCE REPORTS**
- **CHANGE REQUESTS**

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- ENTERPRISE ENVIRONMENTAL FACTORS
  - Legal restrictions, such as country or local regulations;
  - Government or industry standards (e.g., product standards, quality standards, safety standards, and workmanship standards);
  - Legal and regulatory requirements and/or constraints;
  - Organizational governance framework (a structured way to provide control, direction, and coordination through people, policies, and processes to meet organizational strategic and operational goals); and
  - Contracting and purchasing constraints.

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- 
- ORGANIZATIONAL PROCESS ASSETS
    - 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; and
    - Configuration management knowledge base containing the versions and baselines of all official organizational standards, policies, procedures, and any project documents.

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## PERFORM INTEGRATED CHANGE CONTROL: TOOLS AND TECHNIQUES

- EXPERT JUDGMENT

- Technical knowledge of the industry and focus area of the project,
- Legislation and regulations,
- Legal and procurement,
- Configuration management, and
- Risk management.

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- CHANGE CONTROL TOOLS

- Identify configuration item
- Record and report configuration item status.
- Perform configuration item verification and audit.
- Identify changes.
- Document changes.
- Decide on changes.
- Track changes.

- DATA ANALYSIS

- Alternatives analysis.
- Cost-benefit analysis.

- DECISION MAKING

- Voting.
- Autocratic decision making.
- Multi-criteria decision analysis.

- MEETINGS

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## PERFORM INTEGRATED CHANGE CONTROL: OUTPUTS

- APPROVED CHANGE REQUESTS
- PROJECT MANAGEMENT PLAN UPDATES
- PROJECT DOCUMENTS UPDATES

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## CLOSE PROJECT OR PHASE

### INPUTS

- .1 Project charter
- .2 Project management plan
  - All components
- .3 Project documents
  - 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 Accepted deliverables
- .5 Business documents
  - Business case
  - Benefits management plan
  - Agreements
- .6 Procurement documentation
- .7 Organizational process assets

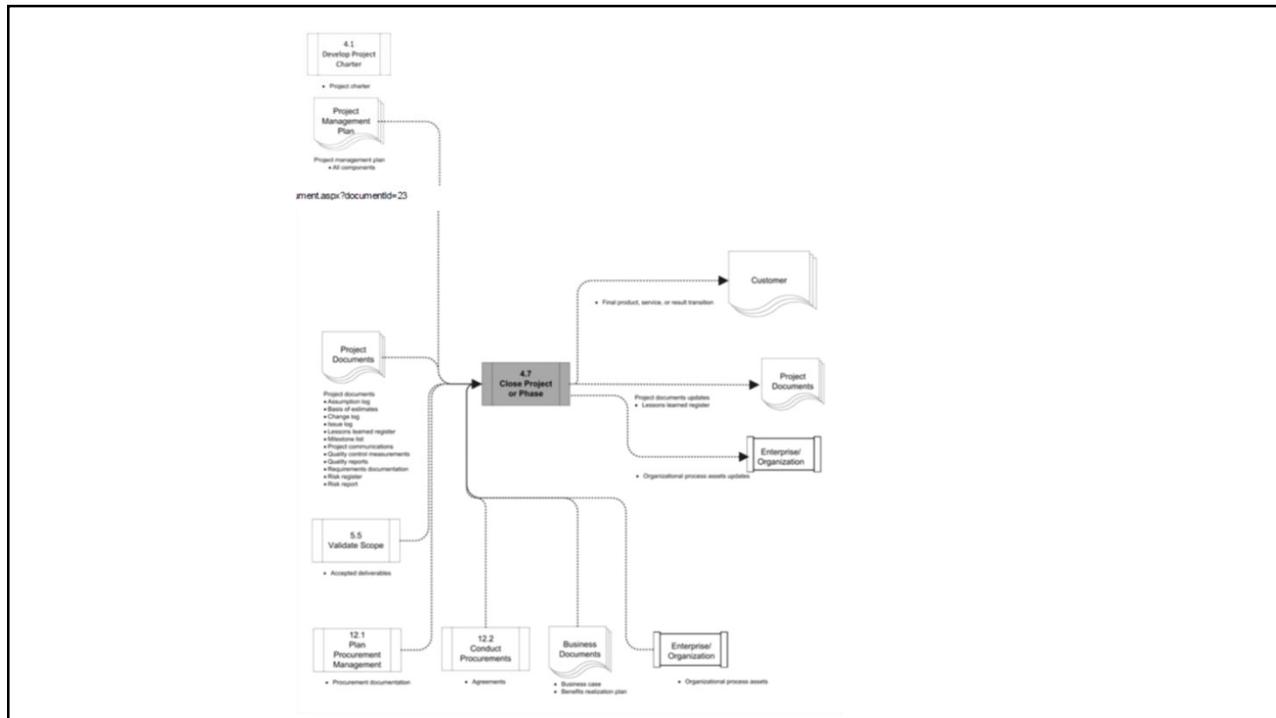
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- ### TOOLS & TECHNIQUES
- .1 Expert judgment
  - .2 Data analysis
    - Document analysis
    - Regression analysis
    - Trend analysis
    - Variance analysis
  - .3 Meetings

### OUTPUT

- 1 Project documents updates
  - Lessons learned register
  - Final product, service, or result transition
  - Final report
  - Organizational process assets updates

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## CLOSE PROJECT OR PHASE

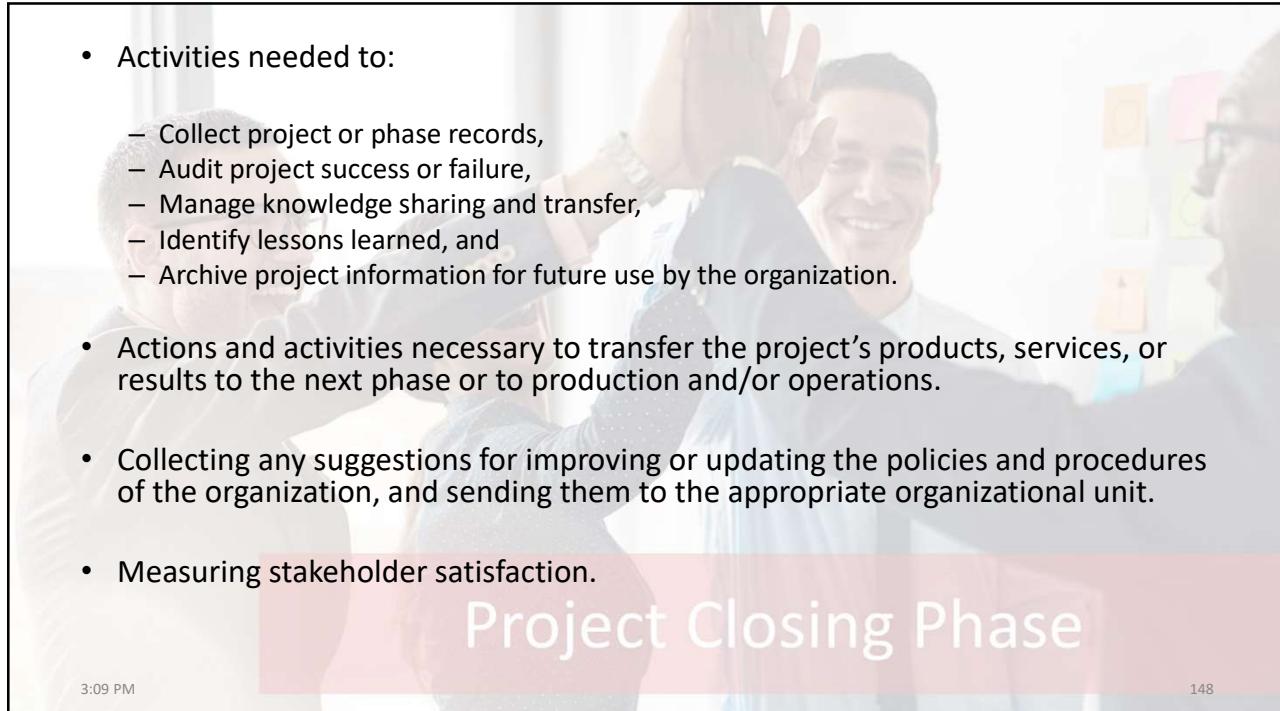
- Actions and activities necessary to satisfy completion or exit criteria for the phase or project such as:
  - Making certain that all documents and deliverables are up-to-date and that all issues are resolved;
  - Confirming the delivery and formal acceptance of deliverables by the customer;
  - Ensuring 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; and
  - Elaborating the final project reports as required by organizational policies.

- 
- 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.

## Project Closing Phase

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- 
- 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.
  - 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.

## Project Closing Phase

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## CLOSE PROJECT OR PHASE: INPUTS

- PROJECT CHARTER
- PROJECT MANAGEMENT PLAN
- PROJECT DOCUMENTS
  - 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.**



Project Closing Phase

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- ACCEPTED DELIVERABLES
- BUSINESS DOCUMENTS
  - Business case.
  - Benefits management plan
- AGREEMENTS
- PROCUREMENT DOCUMENTATION
- ORGANIZATIONAL PROCESS ASSETS

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Project Closing Phase

## CLOSE PROJECT OR PHASE: TOOLS AND TECHNIQUES

- EXPERT JUDGMENT
  - Management control,
  - Audit,
  - Legal and procurement, and
  - Legislation and regulations.
- DATA ANALYSIS
  - Document analysis
  - Regression analysis.
  - Trend analysis
  - Variance analysis
- MEETINGS

Project Closing Phase

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## CLOSE PROJECT OR PHASE: OUTPUTS

- PROJECT DOCUMENTS UPDATES
- FINAL PRODUCT, SERVICE, OR RESULT TRANSITION
- FINAL REPORT
  - Summary level description of the project or phase.
  - Scope objectives
  - Quality objectives,
  - Cost objectives,
  - Summary of the validation information for the final product, service, or result.
  - Schedule objectives
  - Summary of how the final product, service, or result
  - Summary of any risks or issues
- ORGANIZATIONAL PROCESS ASSET UPDATES

Project Closing Phase

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# PROJECT SCOPE MANAGEMENT



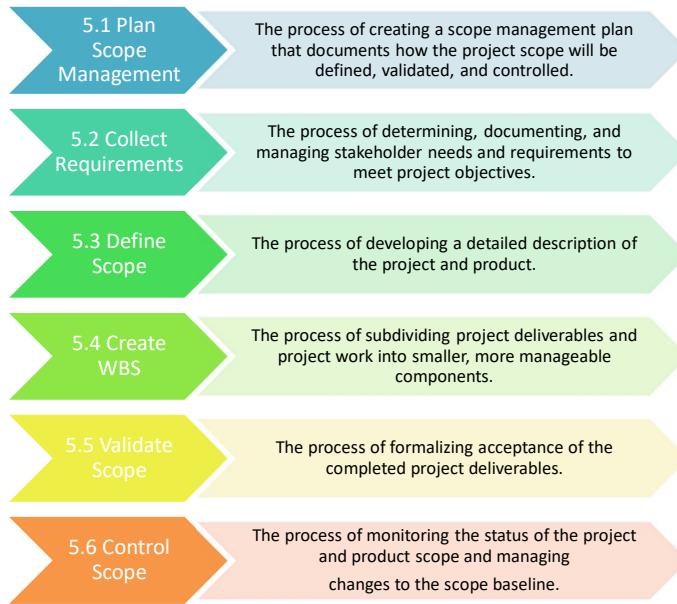
**Project Scope Management** includes the processes required to ensure that the project includes all the work required and only the work required, to complete the project successfully.

When a project team delivers more than what the client required, this is called "gold plating" which cost more and take longer time.

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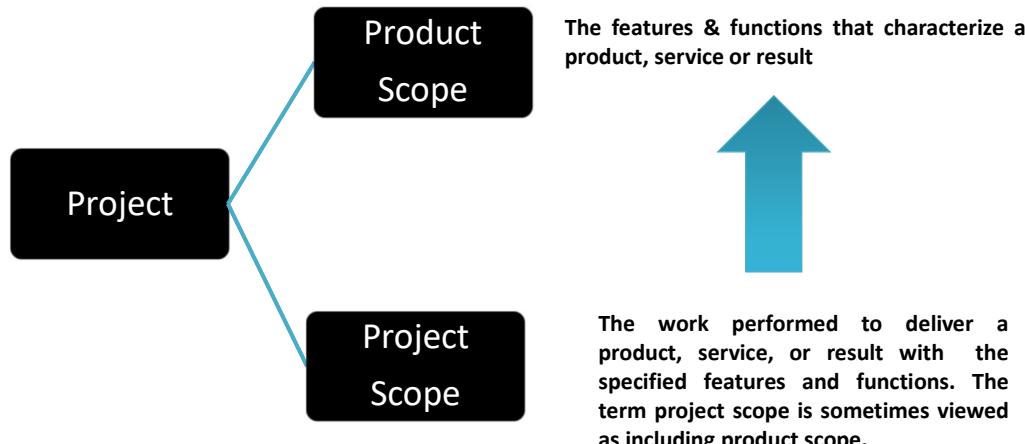
## Project Scope Management processes



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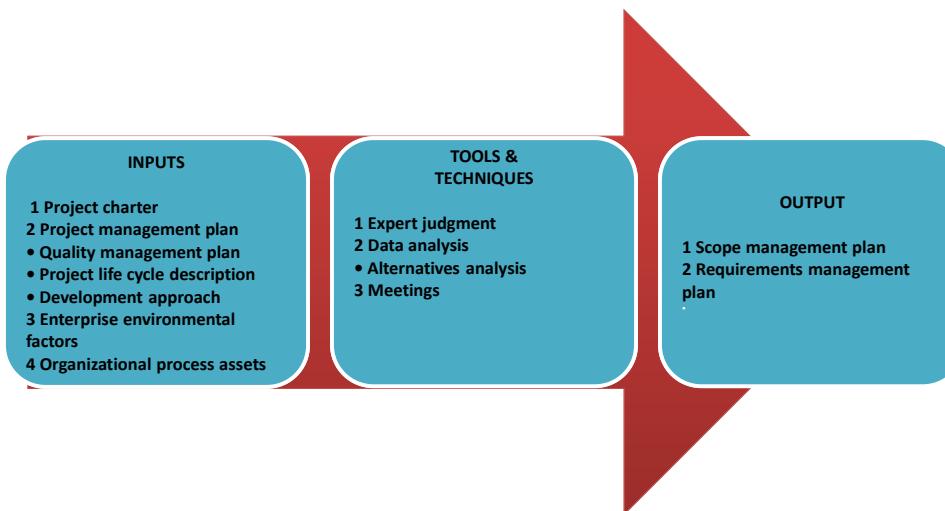
## Product Scope & Project Scope



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## Plan Scope Management



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## PLAN SCOPE MANAGEMENT: INPUTS

- PROJECT CHARTER
- PROJECT MANAGEMENT PLAN
  - Quality management plan.
  - Project life cycle description
  - Development approach
- ENTERPRISE ENVIRONMENTAL FACTORS
  - Organization's culture,
  - Infrastructure,
  - Personnel administration, and
  - Marketplace conditions.

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- ORGANIZATIONAL PROCESS ASSETS
  - Policies and procedures, and
  - Historical information and lessons learned repositories

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## PLAN SCOPE MANAGEMENT: TOOLS AND TECHNIQUES

- EXPERT JUDGMENT
  - Previous similar projects, and
  - Information in the industry, discipline, and application area.
- DATA ANALYSIS
- MEETINGS

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## PLAN SCOPE MANAGEMENT: OUTPUTS

- SCOPE MANAGEMENT PLAN
  - Process for preparing a project scope statement;
  - Process that enables the creation of the WBS from the detailed project scope statement;
  - Process that establishes how the scope baseline will be approved and maintained; and
  - Process that specifies how formal acceptance of the completed project deliverables will be obtained.

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- **REQUIREMENTS MANAGEMENT PLAN**

- How requirements activities will be planned, tracked, and reported;
- Configuration management activities such as: how changes will be initiated; how impacts will be analyzed; how they will be traced, tracked, and reported; as well as the authorization levels required to approve these changes;
- Requirements prioritization process;
- Metrics that will be used and the rationale for using them; and
- Traceability structure that reflects the requirement attributes captured on the traceability matrix.

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## Collect Requirements

### INPUTS

- .1 Project charter
- .2 Project management plan
  - Scope management plan
  - Requirements management plan
  - Stakeholder engagement plan
- .3 Project documents
  - Assumption log
  - Lessons learned register
  - Stakeholder register
- .4 Business documents
  - Business case
  - Agreements
  - Enterprise environmental factors
  - Organizational process assets

### TOOLS & TECHNIQUES

- .1 Expert judgment
- .2 Data gathering
  - Brainstorming
  - Interviews
  - Focus groups
  - Questionnaires and surveys
  - Benchmarking
- .3 Data analysis
- .4 Document analysis
- .5 Decision making
  - Voting
  - Multicriteria decision analysis
- .6 Data representation
  - Affinity diagrams
  - Mind mapping
- .7 Interpersonal and team skills
  - Nominal group technique
  - Observation/conversation
  - Facilitation
- .8 Context diagram
- .9 Prototypes

### OUTPUT

- .1 Requirements documentation
- .2 Requirements traceability matrix

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## COLLECT REQUIREMENTS: INPUTS

- PROJECT CHARTER
- PROJECT MANAGEMENT PLAN
  - Scope management plan.
  - Requirements management plan
  - Stakeholder engagement plan
- PROJECT DOCUMENTS
  - Assumption Log
  - Lessons learned register
  - Stakeholder Register.
- BUSINESS DOCUMENTS

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- AGREEMENTS
- ENTERPRISE ENVIRONMENTAL FACTORS
  - Organization's culture,
  - Infrastructure,
  - Personnel administration, and
  - Marketplace conditions.
- ORGANIZATIONAL PROCESS ASSETS
  - Policies and procedures, and
  - Historical information and lessons learned repository with information from previous projects.

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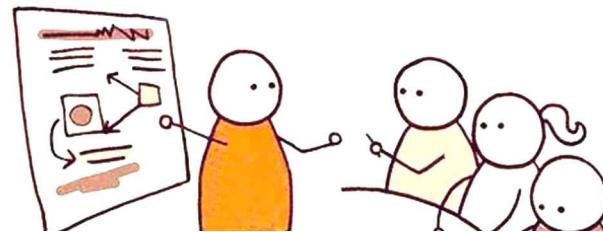
# COLLECT REQUIREMENTS: TOOLS AND TECHNIQUES

- EXPERT JUDGMENT

- Business analysis,
- Requirements elicitation,
- Requirements analysis,
- Requirements documentation,
- Project requirements in previous similar projects,
- Diagramming techniques,
- Facilitation, and
- Conflict management.

- DATA GATHERING

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



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- DATA ANALYSIS

- Agreements;
- Business plans;
- Business process or interface documentation;
- Business rules repositories;
- Current process flows;
- Marketing literature;
- Problem/issue logs;
- Policies and procedures;
- Regulatory documentation such as laws, codes, or ordinances, etc.;
- Requests for proposal; and
- Use cases.

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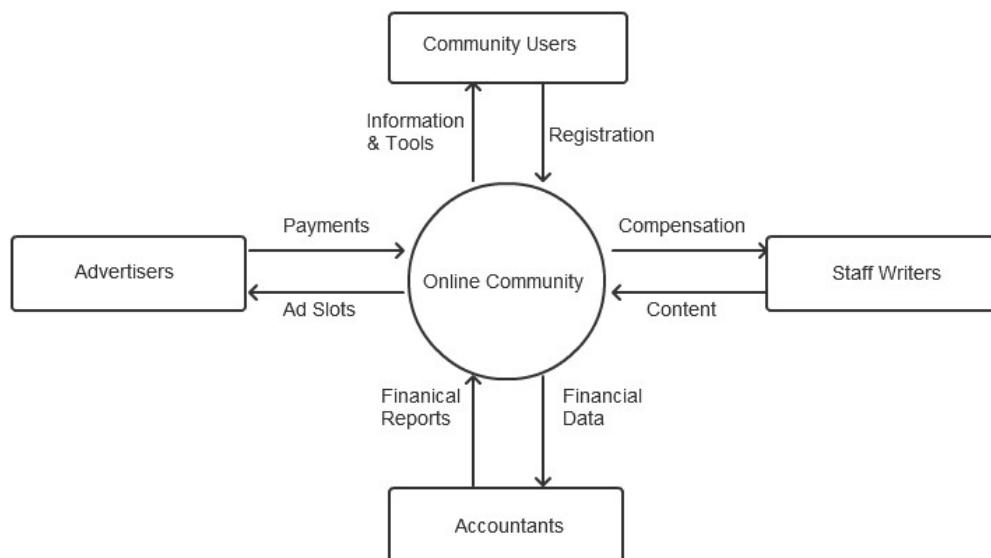
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- DECISION MAKING
  - Voting
    - *Unanimity.*
    - *Majority.*
    - *Plurality.*
  - Autocratic decision making
  - Multicriteria decision analysis
- DATA REPRESENTATION
  - Affinity diagrams
  - Mind mapping
- INTERPERSONAL AND TEAM SKILLS
  - Nominal group technique.
  - Observation/conversation.
  - Facilitation
    - *Joint application design/development*
    - *Quality function deployment (QFD).*
    - *User stories*
- CONTEXT DIAGRAM
- PROTOTYPES

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## CONTEXT DIAGRAM



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## COLLECT REQUIREMENTS: OUTPUTS

- REQUIREMENTS DOCUMENTATION
  - Business requirements.
  - Stakeholder requirements.
  - Solution requirements.
    - Functional requirements.
    - Nonfunctional requirements.
  - Transition and readiness requirements.
  - Project requirements.
  - Quality requirements.
- REQUIREMENTS TRACEABILITY MATRIX

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- Tracing requirements includes but is not limited to:
  - Business needs, opportunities, goals, and objectives;
  - Project objectives;
  - Project scope and WBS deliverables;
  - Product design;
  - Product development;
  - Test strategy and test scenarios; and
  - High-level requirements to more detailed requirements.

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Requirements Traceability Matrix								
Project Name:								
Cost Center:								
Project Description:								
ID	Associate ID	Requirements Description	Business Needs, Opportunities, Goals, Objectives	Project Objectives	WBS Deliverables	Product Design	Product Development	Test Cases
001	1.0							
	1.1							
	1.2							
	1.2.1							
002	2.0							
	2.1							
	2.1.1							
003	3.0							
	3.1							
	3.2							
004	4.0							
005	5.0							

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## DEFINE SCOPE



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## DEFINE SCOPE: INPUTS

- PROJECT CHARTER
- PROJECT MANAGEMENT PLAN
- PROJECT DOCUMENTS
  - Assumption log
  - Requirements documentation
  - Risk register
- ENTERPRISE ENVIRONMENTAL FACTORS
  - Organization's culture,
  - Infrastructure,
  - Personnel administration, and
  - Marketplace conditions

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- ORGANIZATIONAL PROCESS ASSETS
  - Policies, procedures, and templates for a project scope statement;
  - Project files from previous projects; and
  - Lessons learned from previous phases or projects

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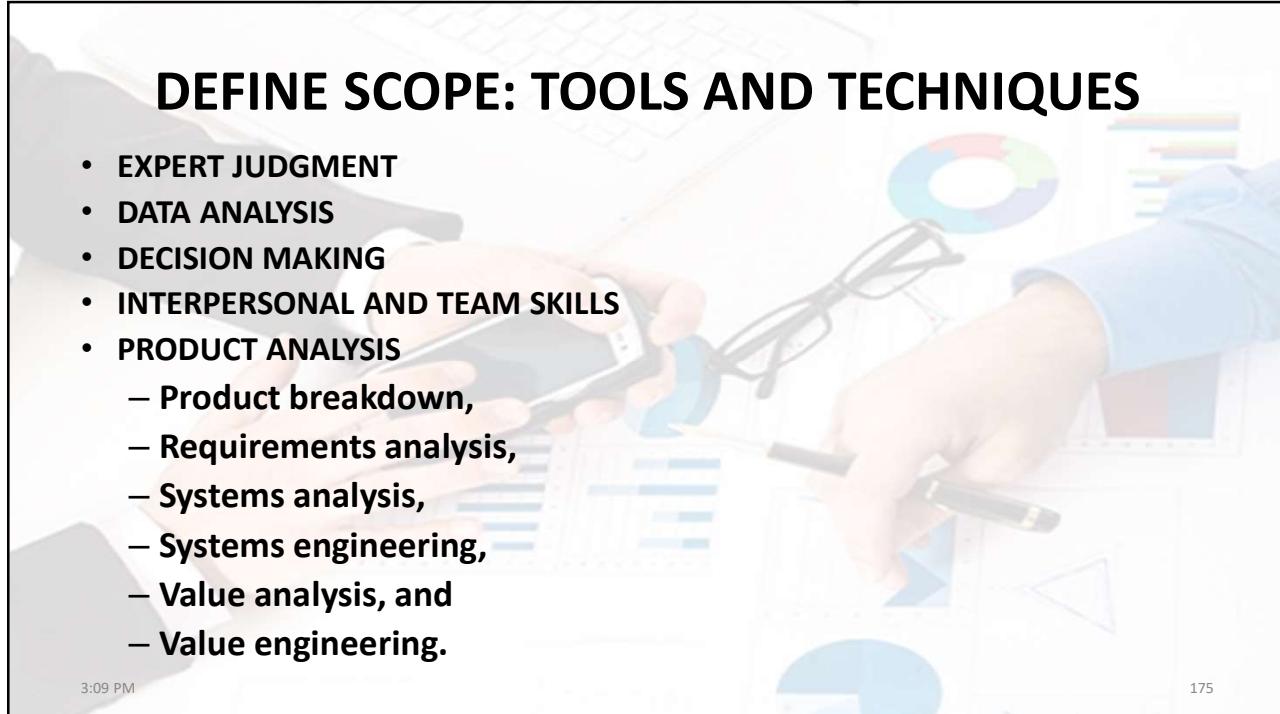
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## DEFINE SCOPE: TOOLS AND TECHNIQUES

- EXPERT JUDGMENT
- DATA ANALYSIS
- DECISION MAKING
- INTERPERSONAL AND TEAM SKILLS
- PRODUCT ANALYSIS
  - Product breakdown,
  - Requirements analysis,
  - Systems analysis,
  - Systems engineering,
  - Value analysis, and
  - Value engineering.

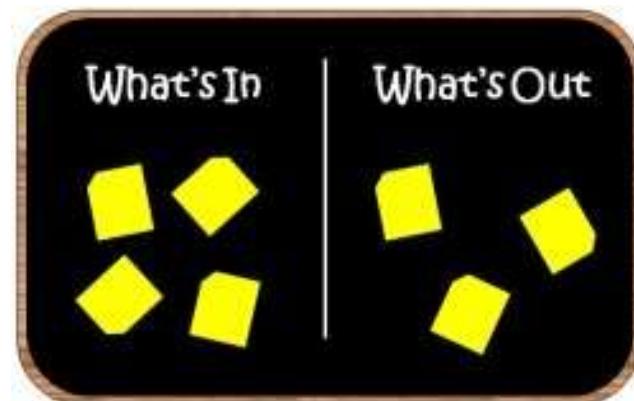
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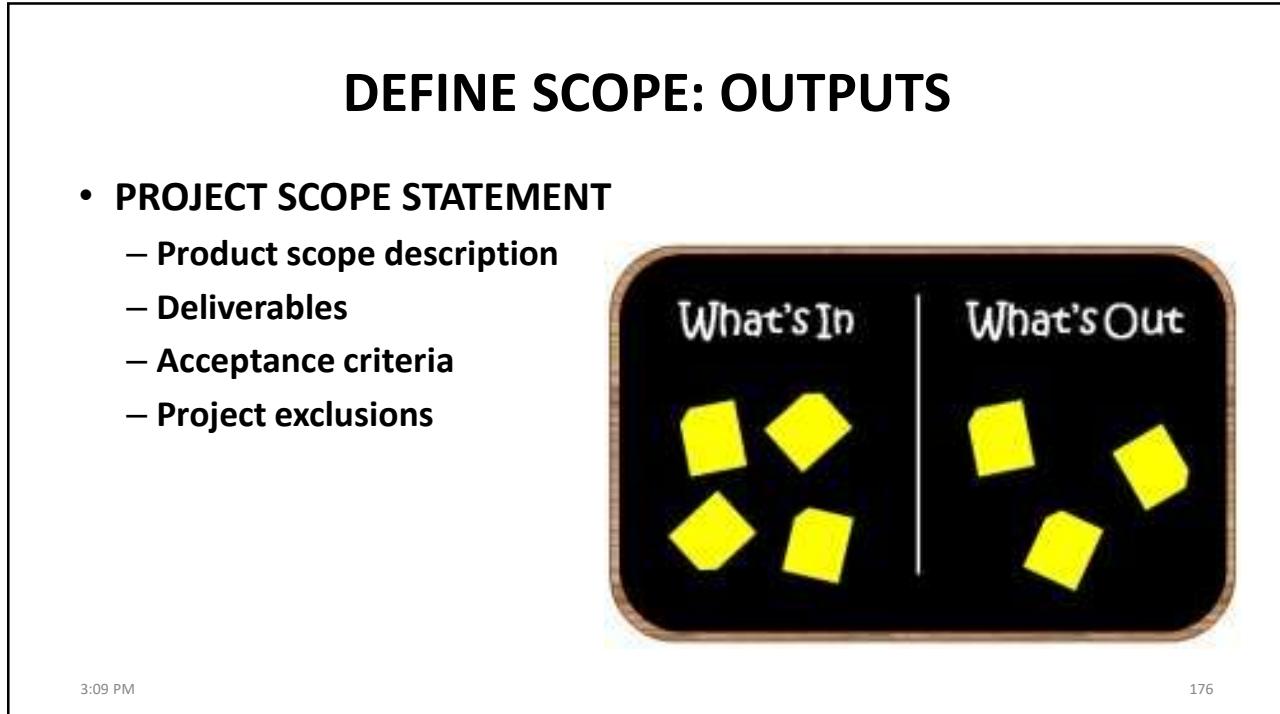
## DEFINE SCOPE: OUTPUTS

- PROJECT SCOPE STATEMENT
  - Product scope description
  - Deliverables
  - Acceptance criteria
  - Project exclusions



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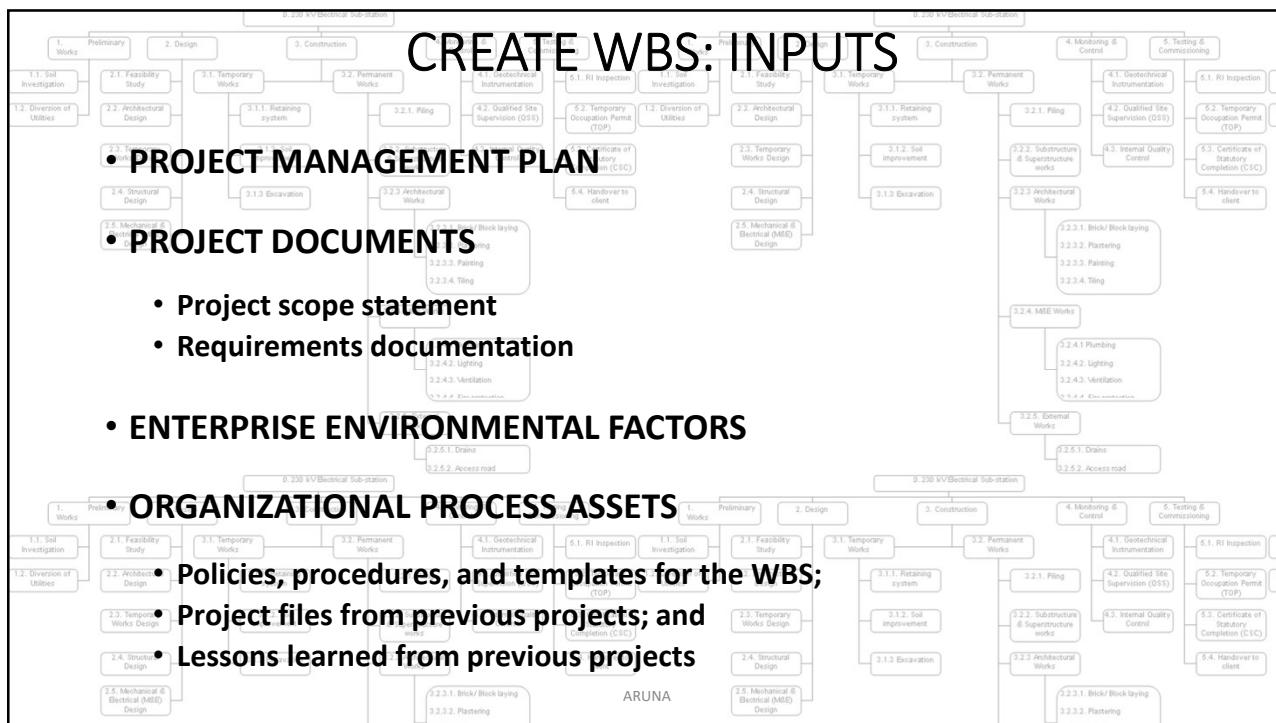
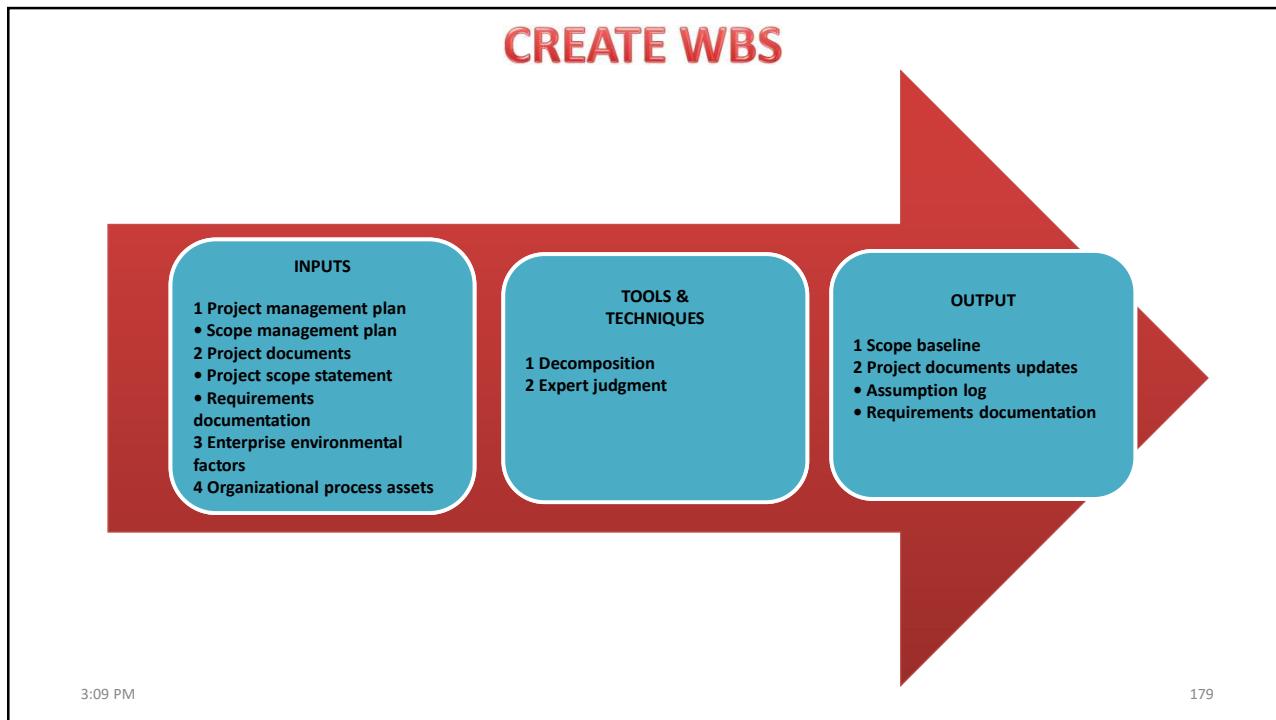


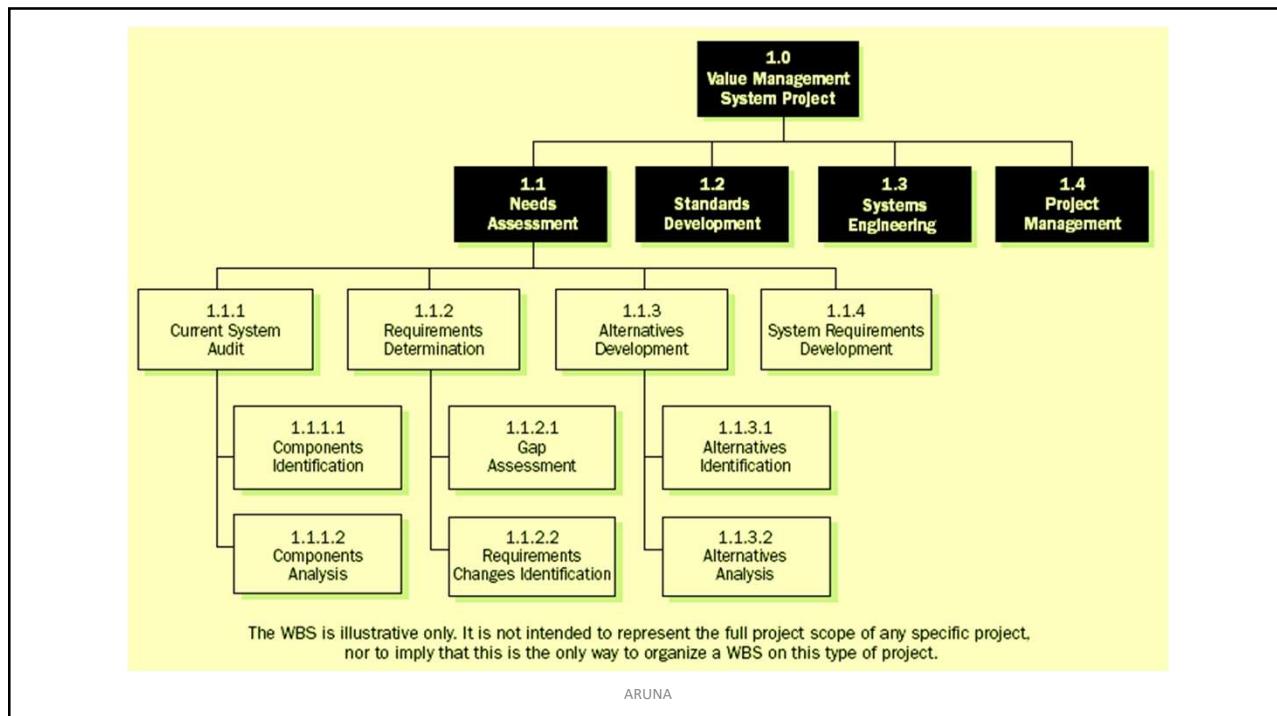
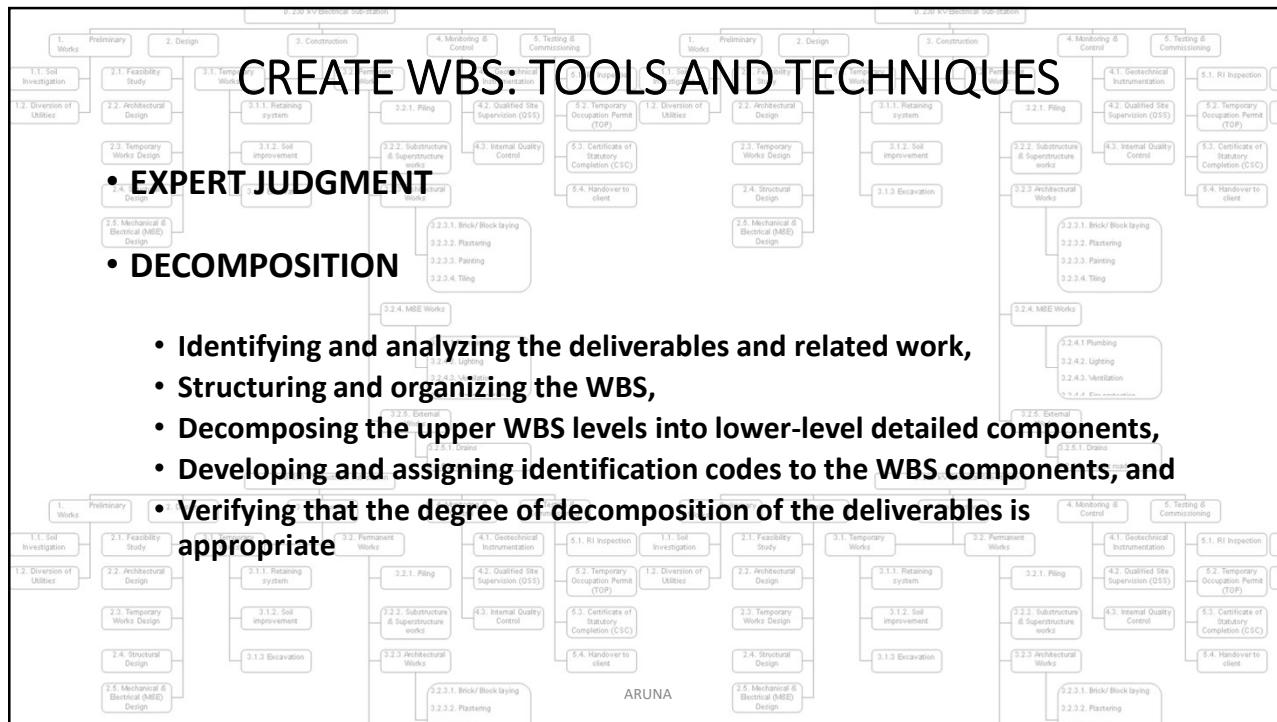
PROJECT CHARTER	PROJECT SCOPE STATEMENT
<ul style="list-style-type: none"> <li>• Project purpose</li> <li>• Measurable project objectives and related success criteria</li> <li>• High-level requirements</li> <li>• High-level project description, boundaries, and key deliverables</li> <li>• Overall project risk</li> <li>• Summary milestone schedule</li> <li>• Preapproved financial resources</li> <li>• Key stakeholder list</li> <li>• Project approval requirements (i.e., what constitutes success, who decides the project is successful, who signs off on the project)</li> <li>• Project exit criteria (i.e., what are the conditions to be met in order to close or to cancel the project or phase)</li> <li>• Assigned project manager, responsibility, and authority level Name and authority of the sponsor or other person(s) authorizing the project charter</li> </ul>	<ul style="list-style-type: none"> <li>• Project scope description (progressively elaborated)</li> <li>• Project deliverables</li> <li>• Acceptance criteria</li> <li>• Project exclusions</li> </ul>

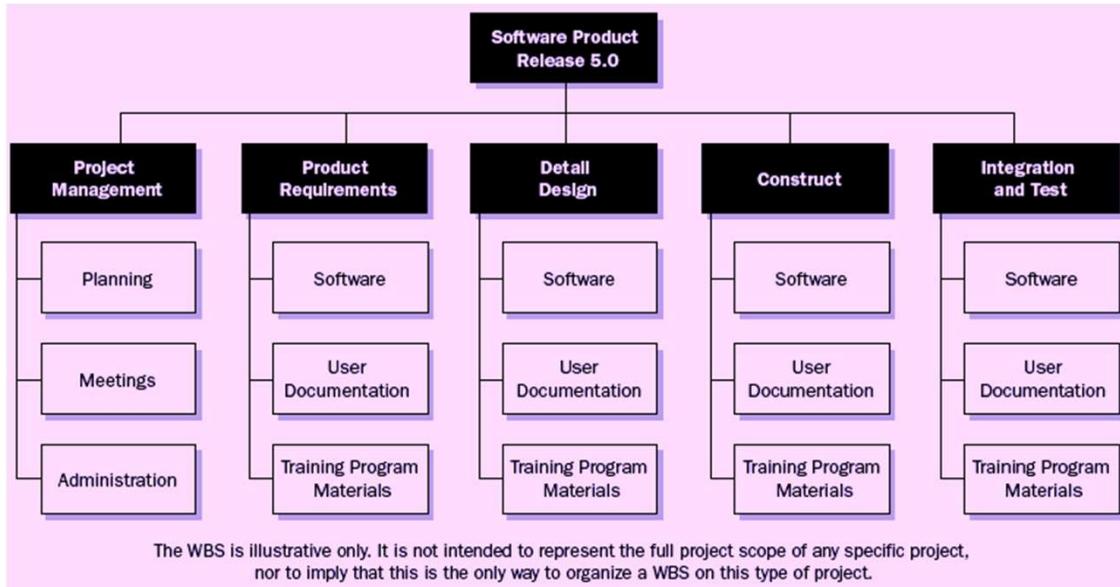
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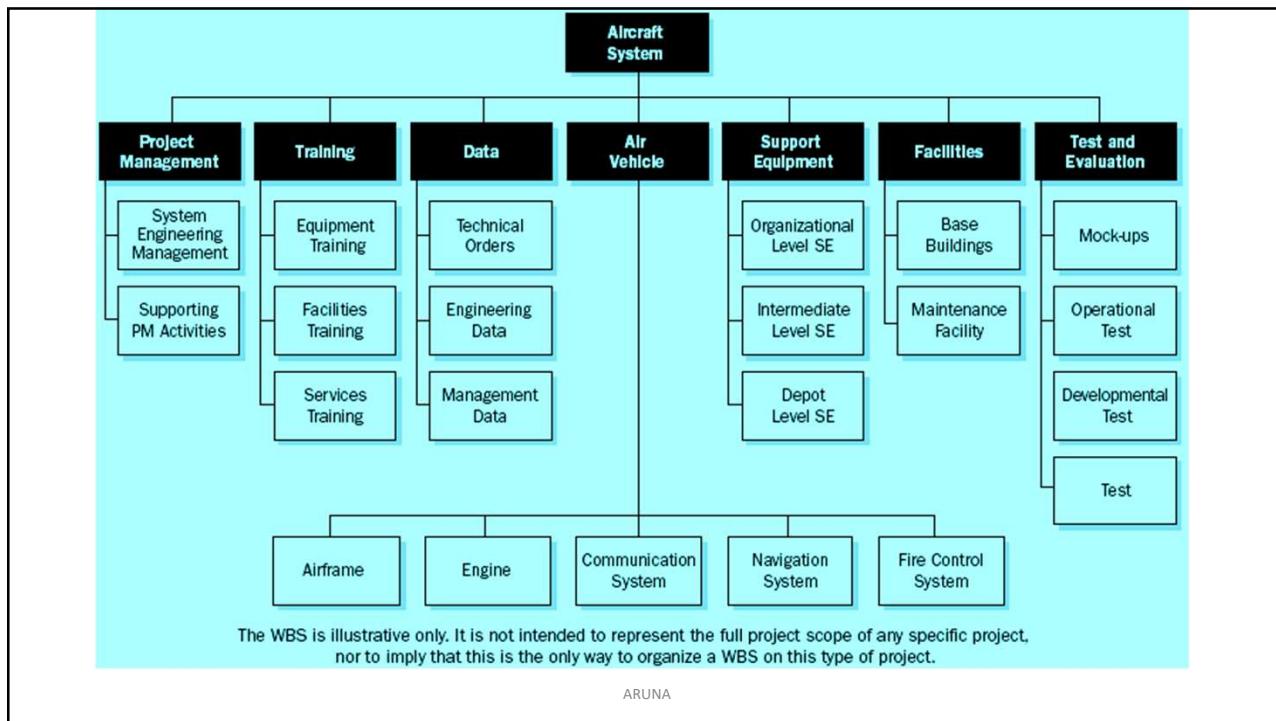
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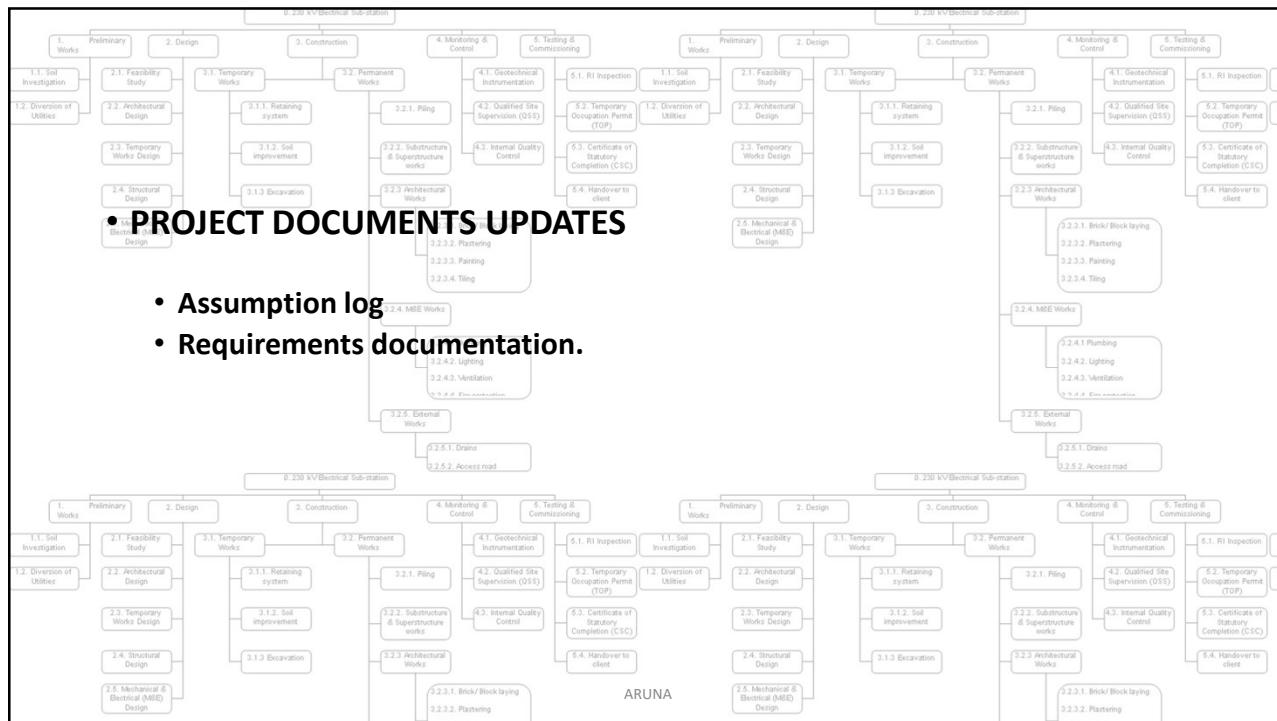
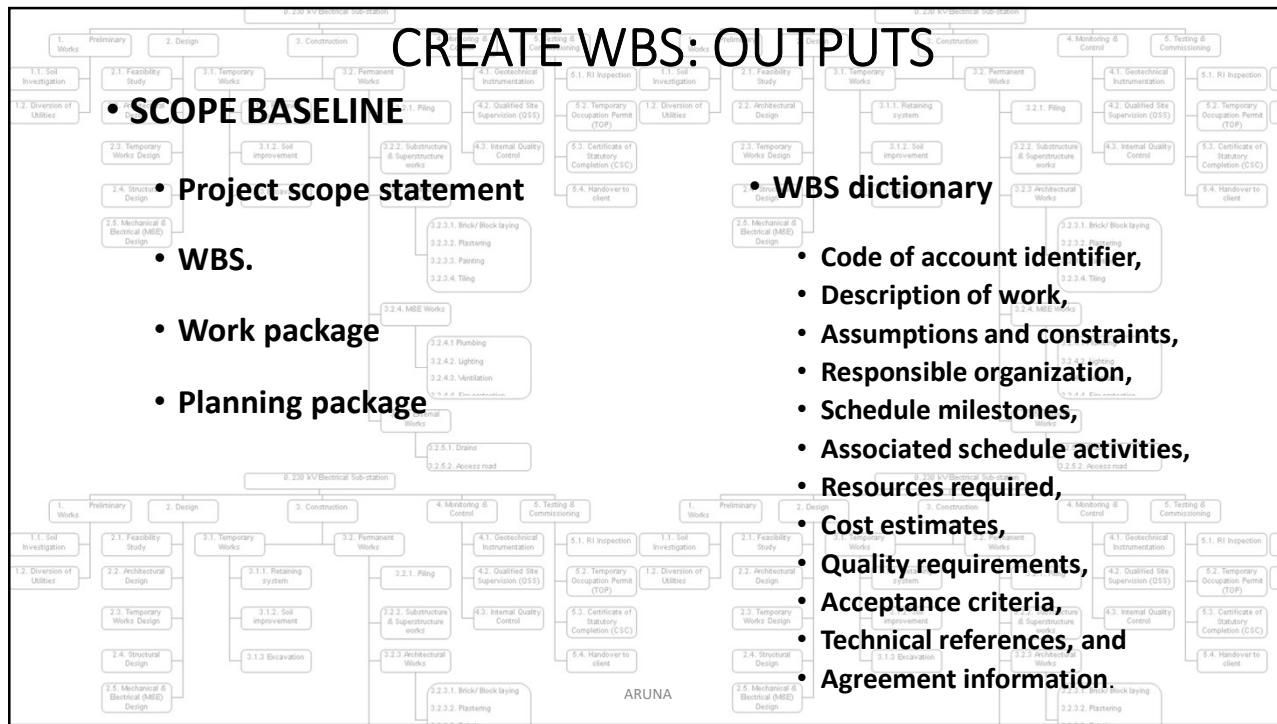


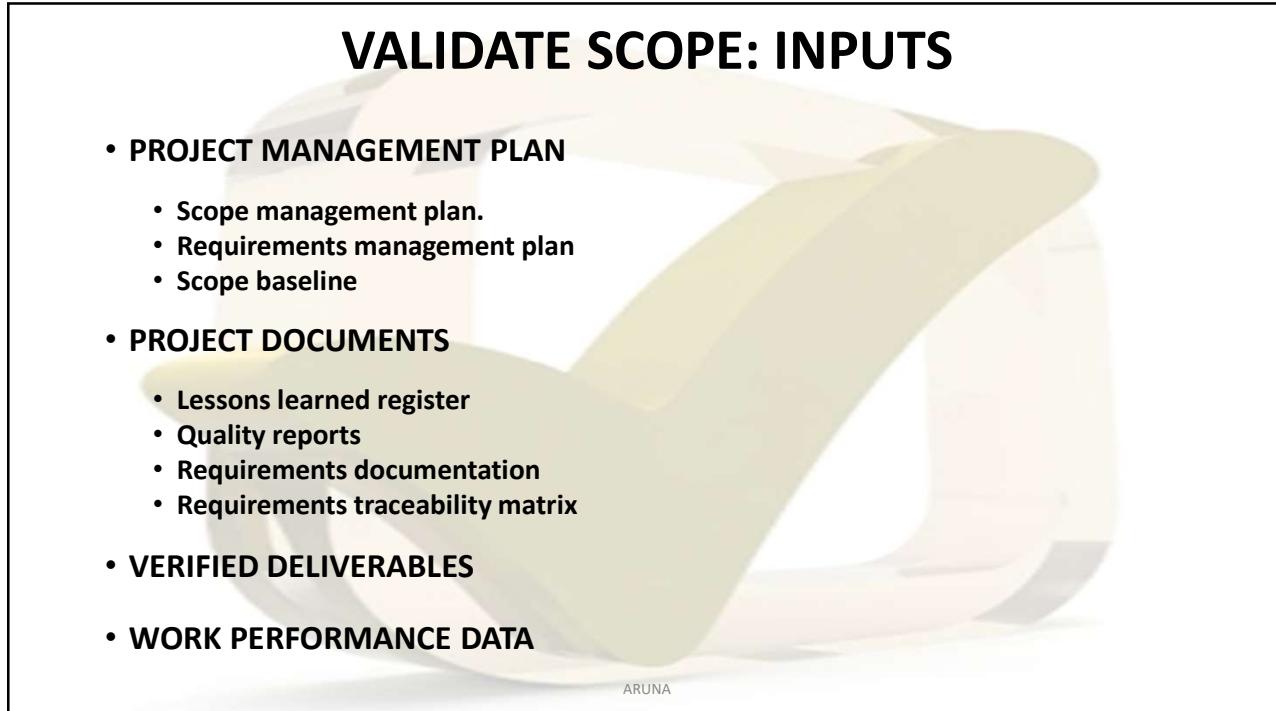
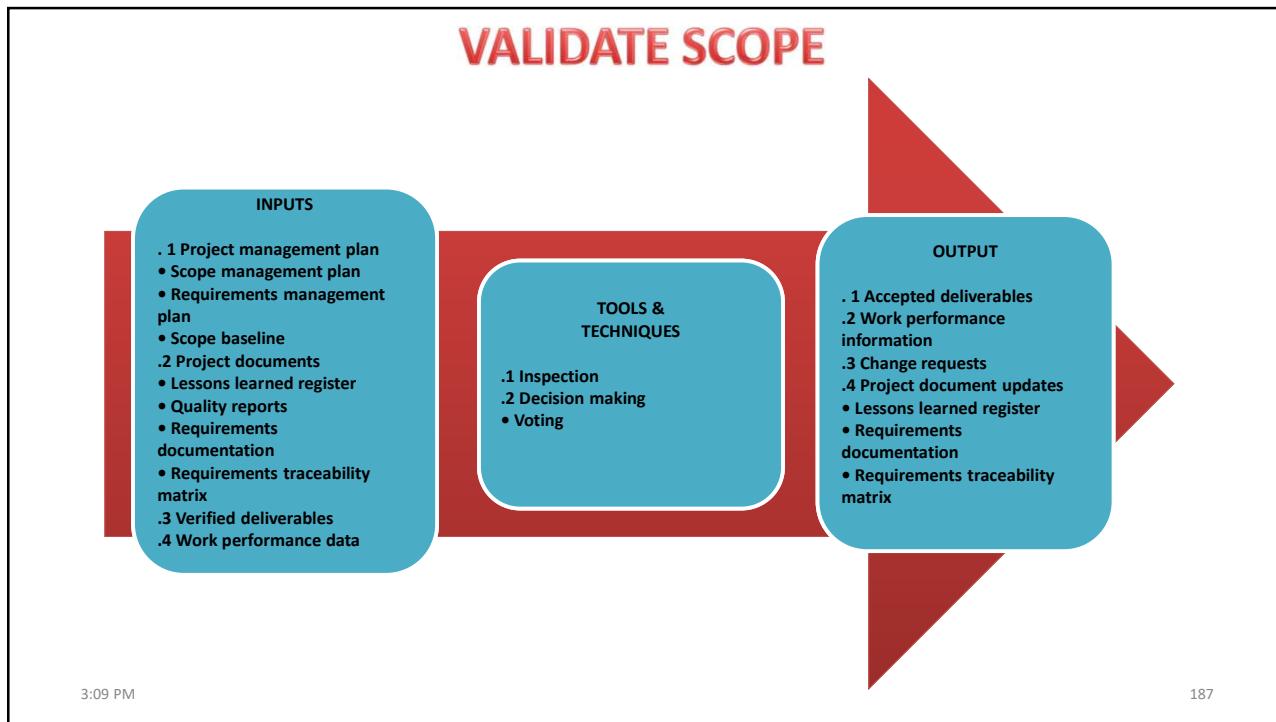


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## VALIDATE SCOPE: TOOLS AND TECHNIQUES

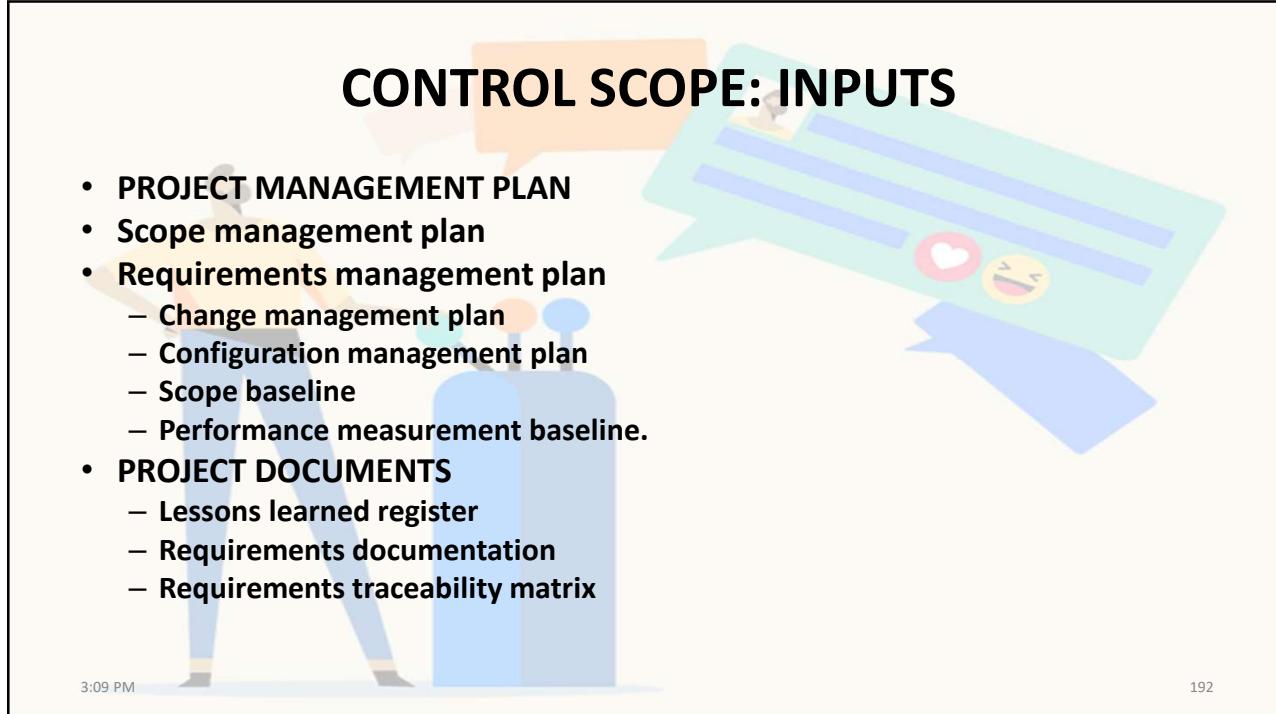
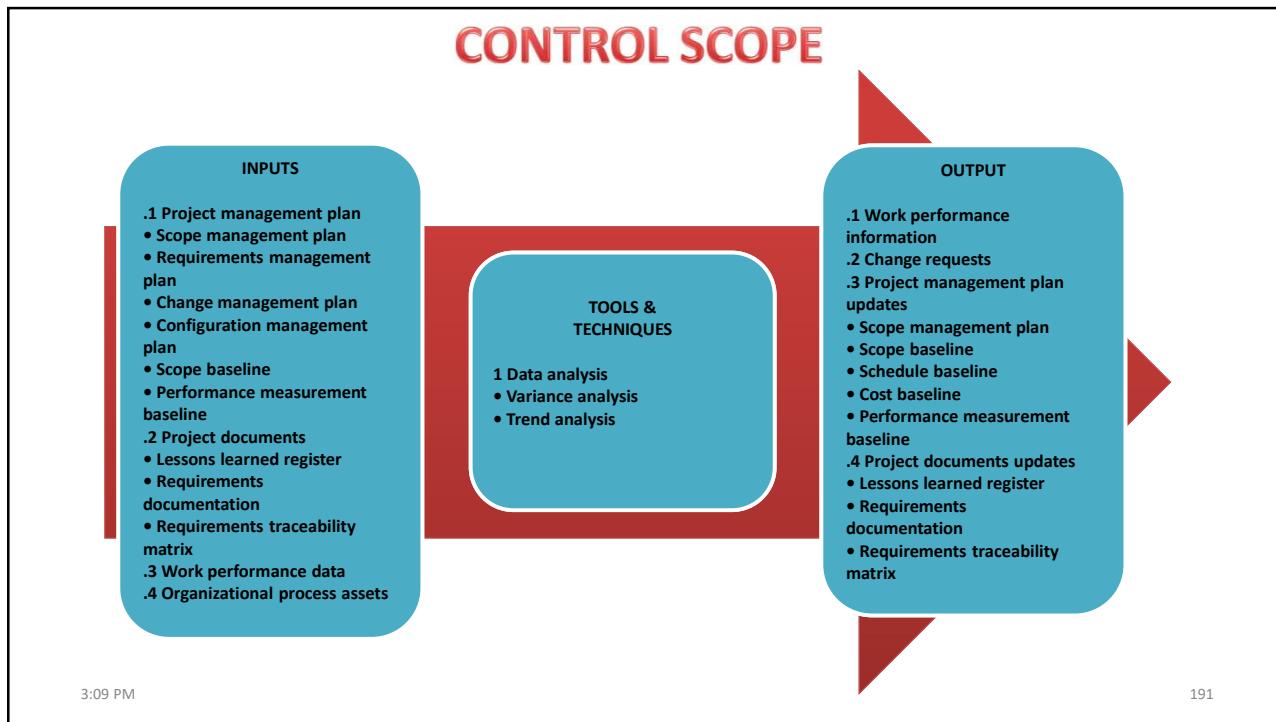
- INSPECTION
- DECISION MAKING

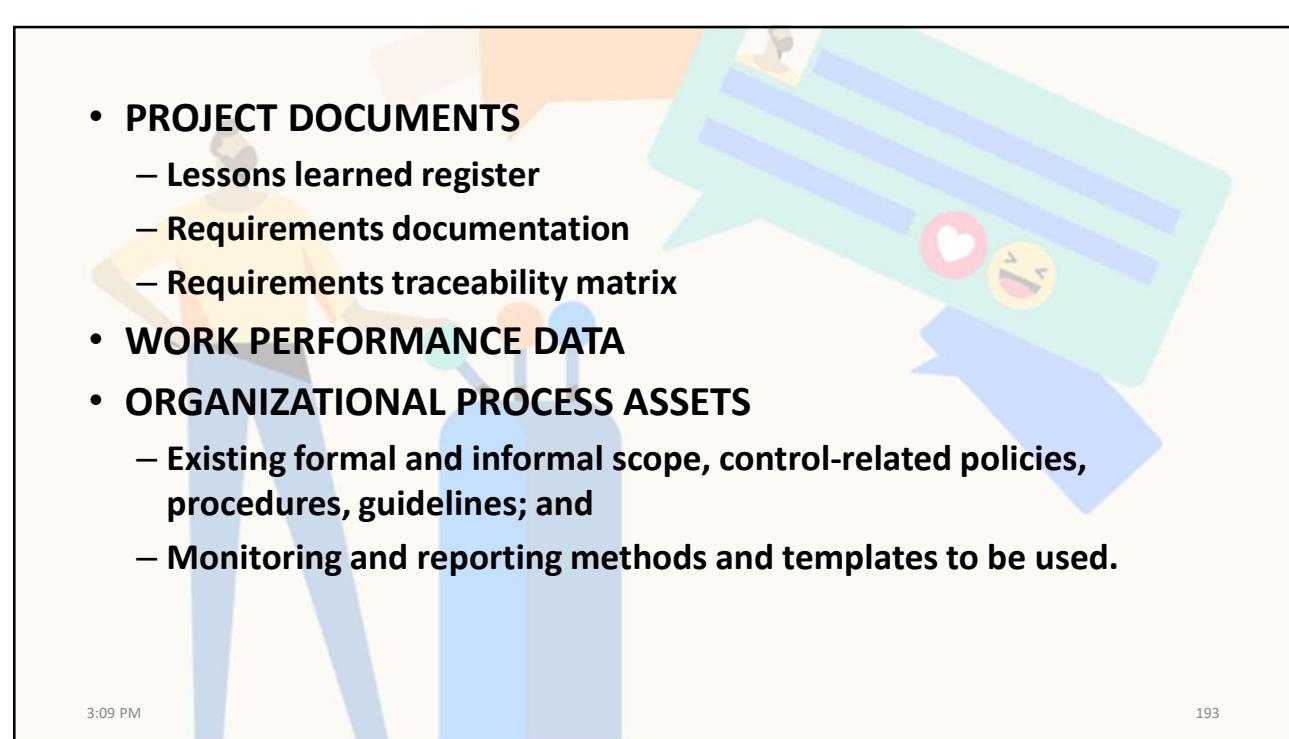
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## VALIDATE SCOPE: OUTPUTS

- ACCEPTED DELIVERABLES
- WORK PERFORMANCE INFORMATION
- CHANGE REQUESTS
- PROJECT DOCUMENTS UPDATES
  - Lessons learned register.
  - Requirements documentation
  - Requirements traceability matrix

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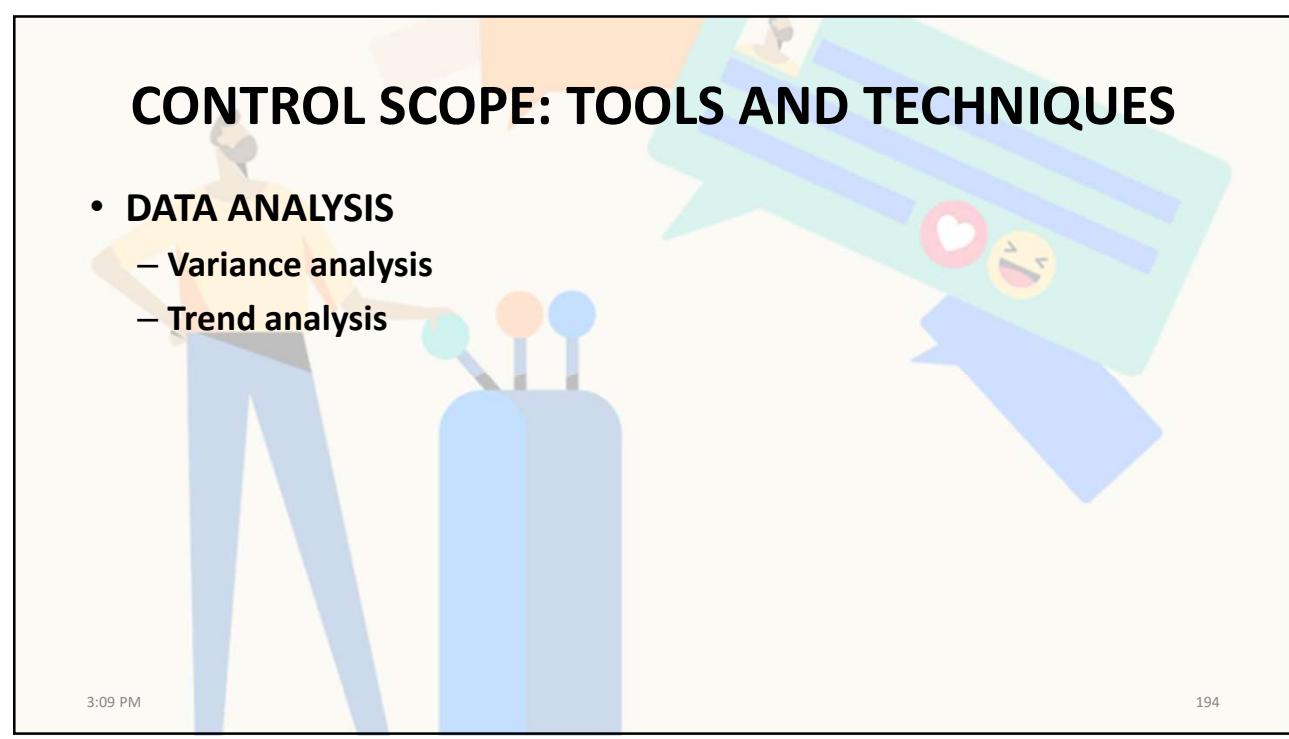


- 
- **PROJECT DOCUMENTS**
    - Lessons learned register
    - Requirements documentation
    - Requirements traceability matrix
  - **WORK PERFORMANCE DATA**
  - **ORGANIZATIONAL PROCESS ASSETS**
    - Existing formal and informal scope, control-related policies, procedures, guidelines; and
    - Monitoring and reporting methods and templates to be used.

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## CONTROL SCOPE: TOOLS AND TECHNIQUES

- 
- **DATA ANALYSIS**
    - Variance analysis
    - Trend analysis

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## CONTROL SCOPE: OUTPUTS

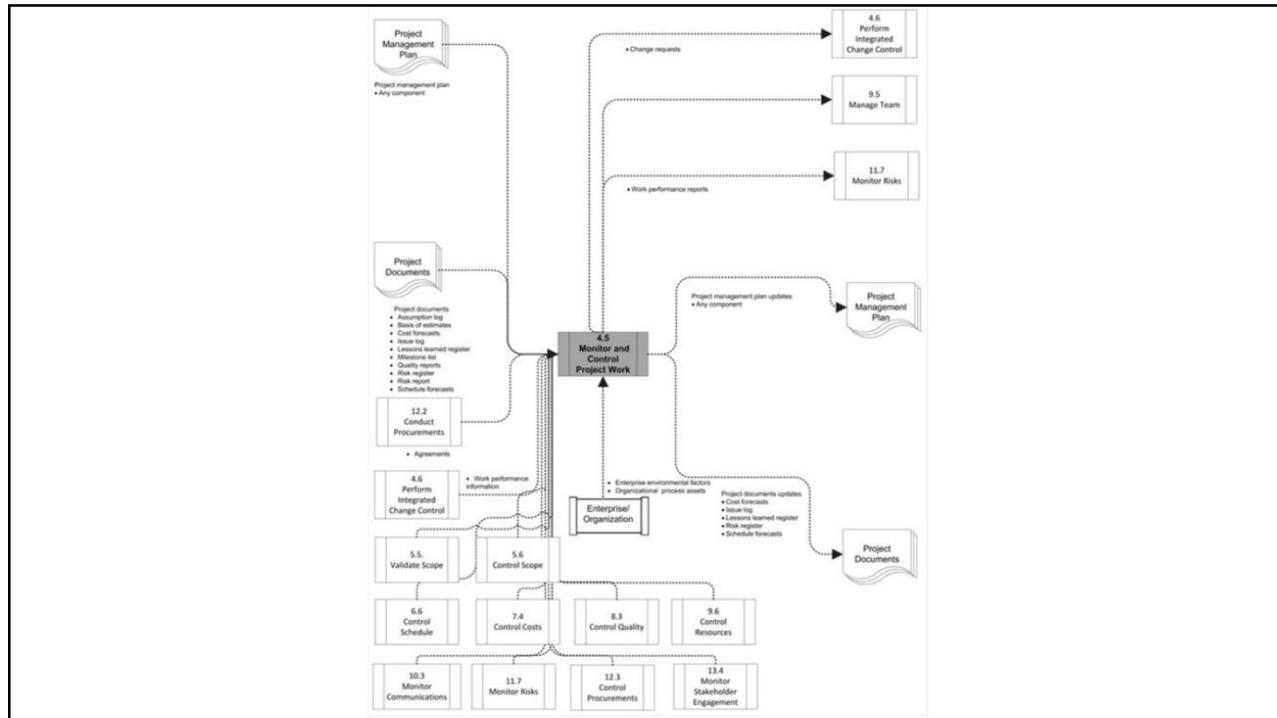
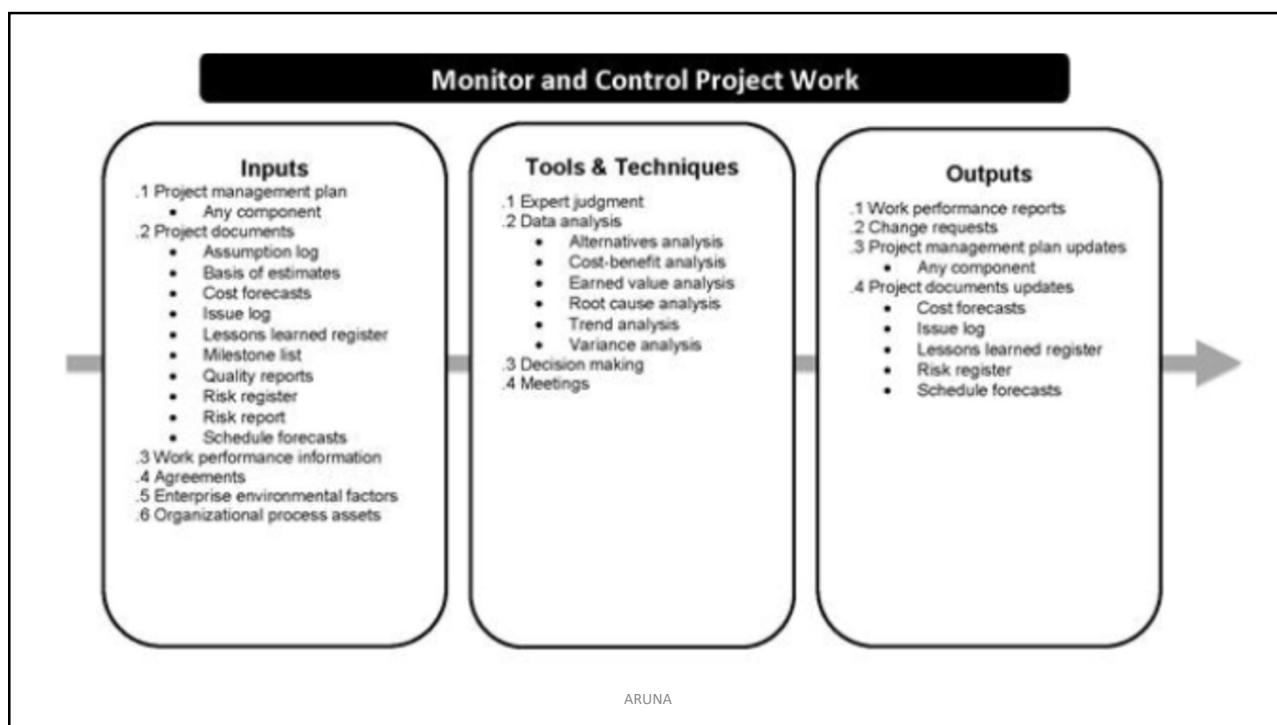
- **WORK PERFORMANCE INFORMATION**
- **CHANGE REQUESTS**
- **PROJECT MANAGEMENT PLAN UPDATES**
  - Scope management plan
  - Scope baseline.
  - Schedule baseline
  - Cost baseline.
  - Performance measurement baseline.
- **PROJECT DOCUMENTS UPDATES**
  - Lessons learned register
  - Requirements documentation
  - Requirements traceability matrix

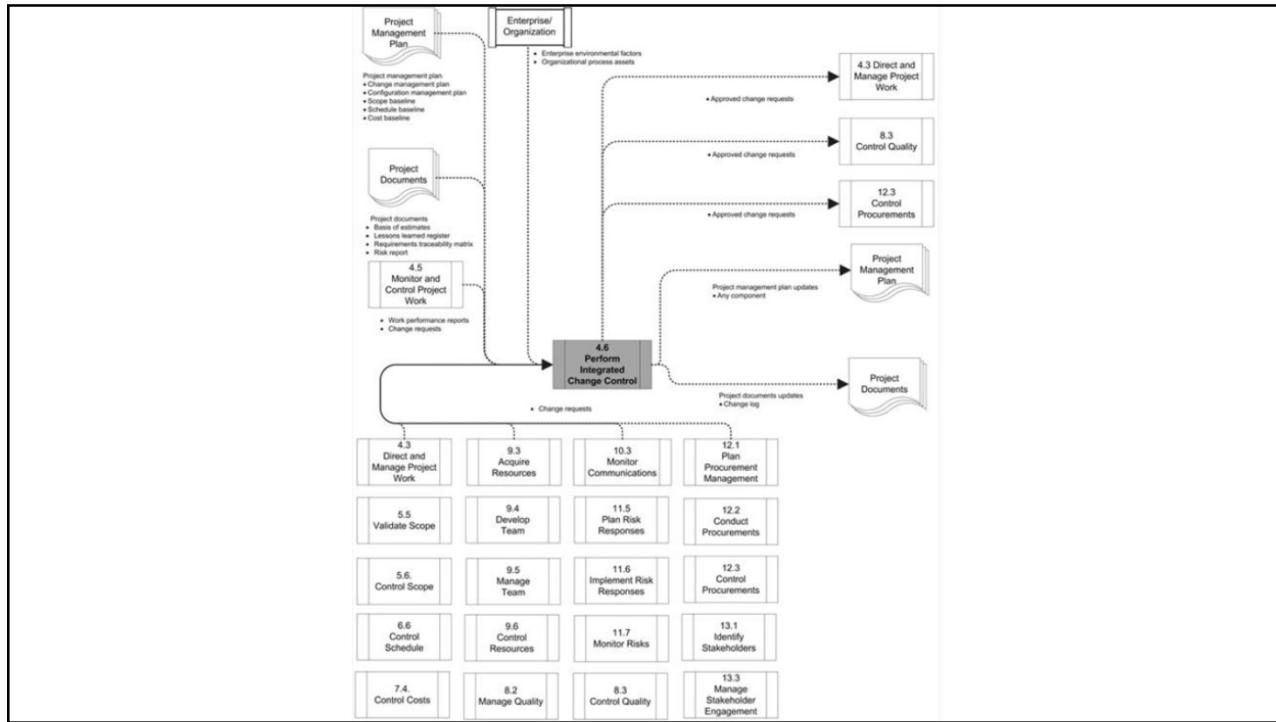
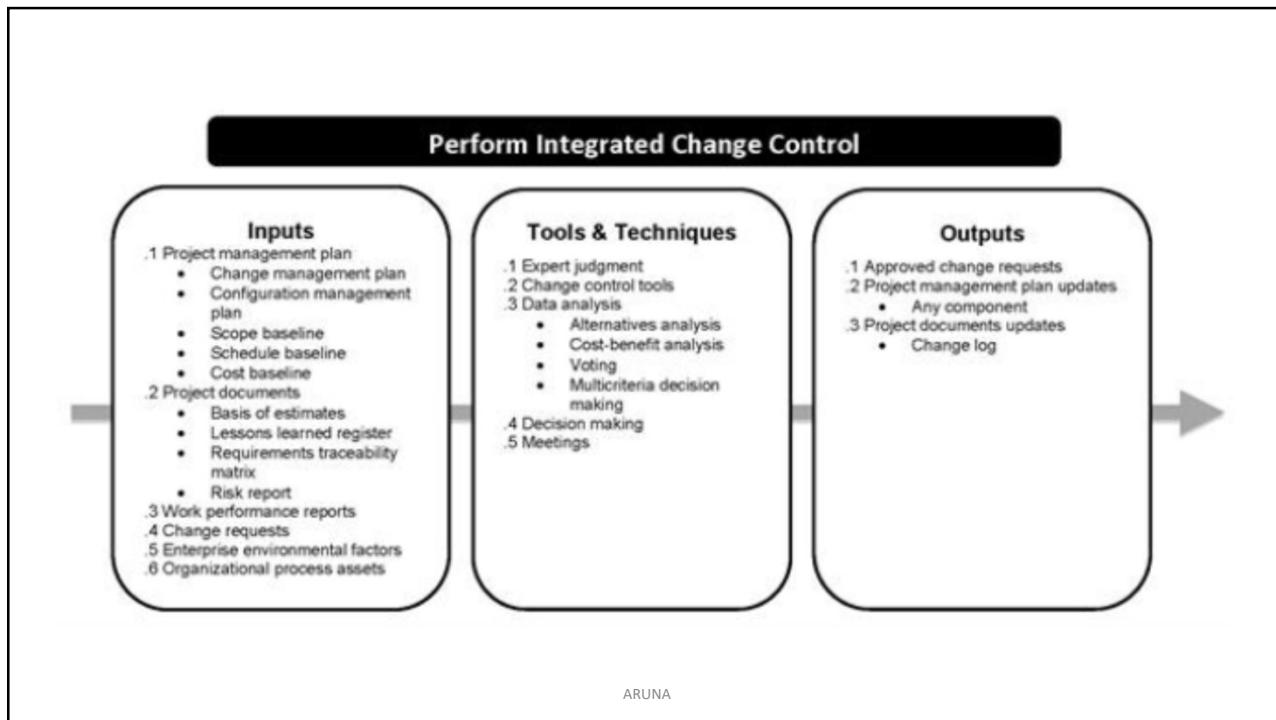
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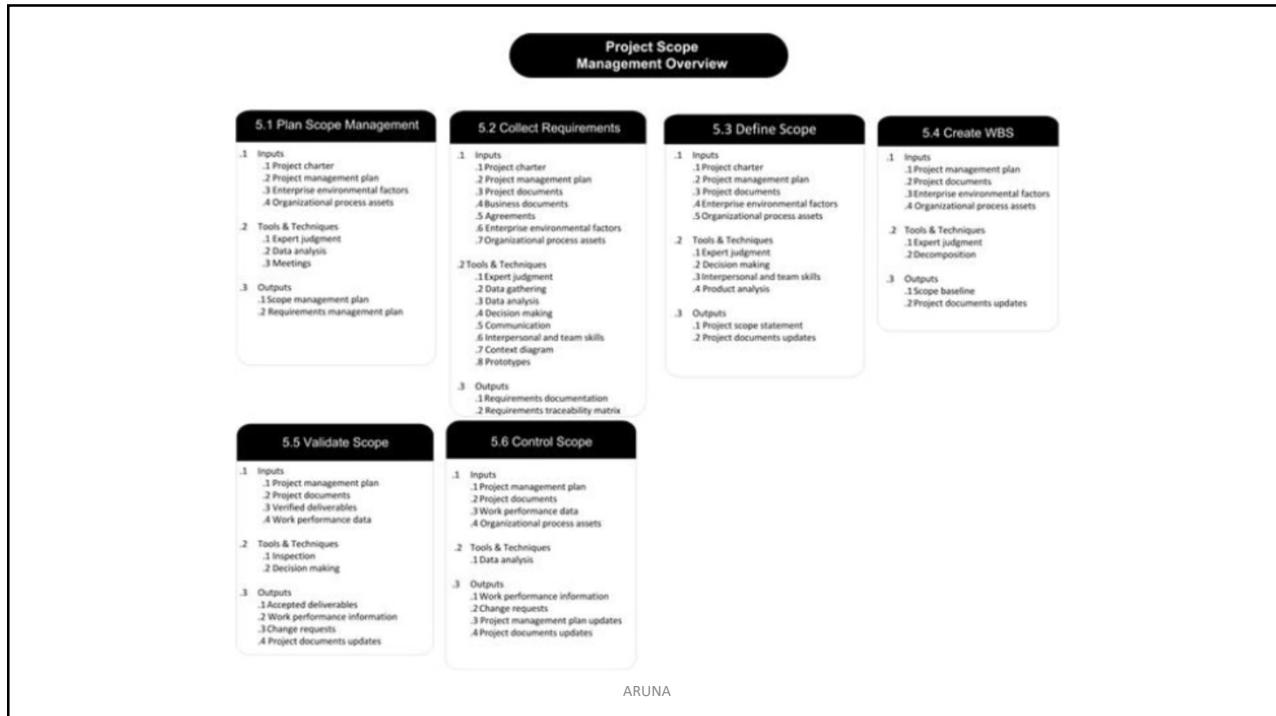
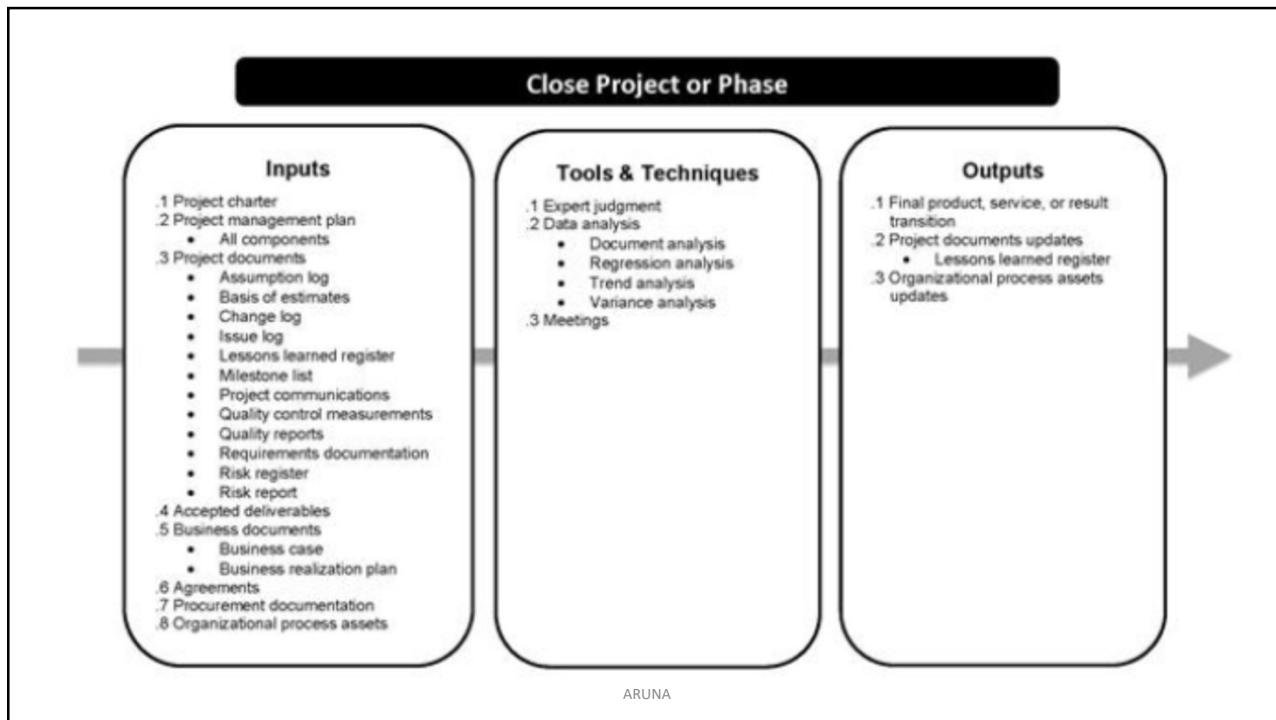
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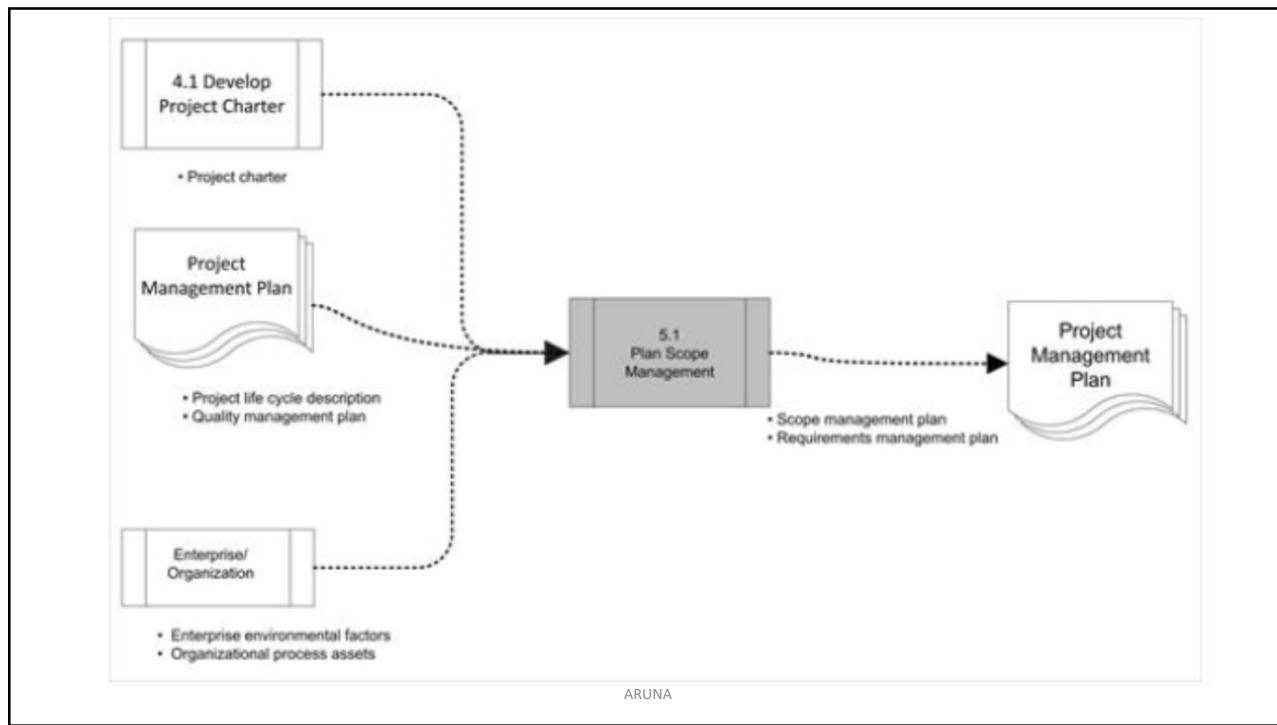
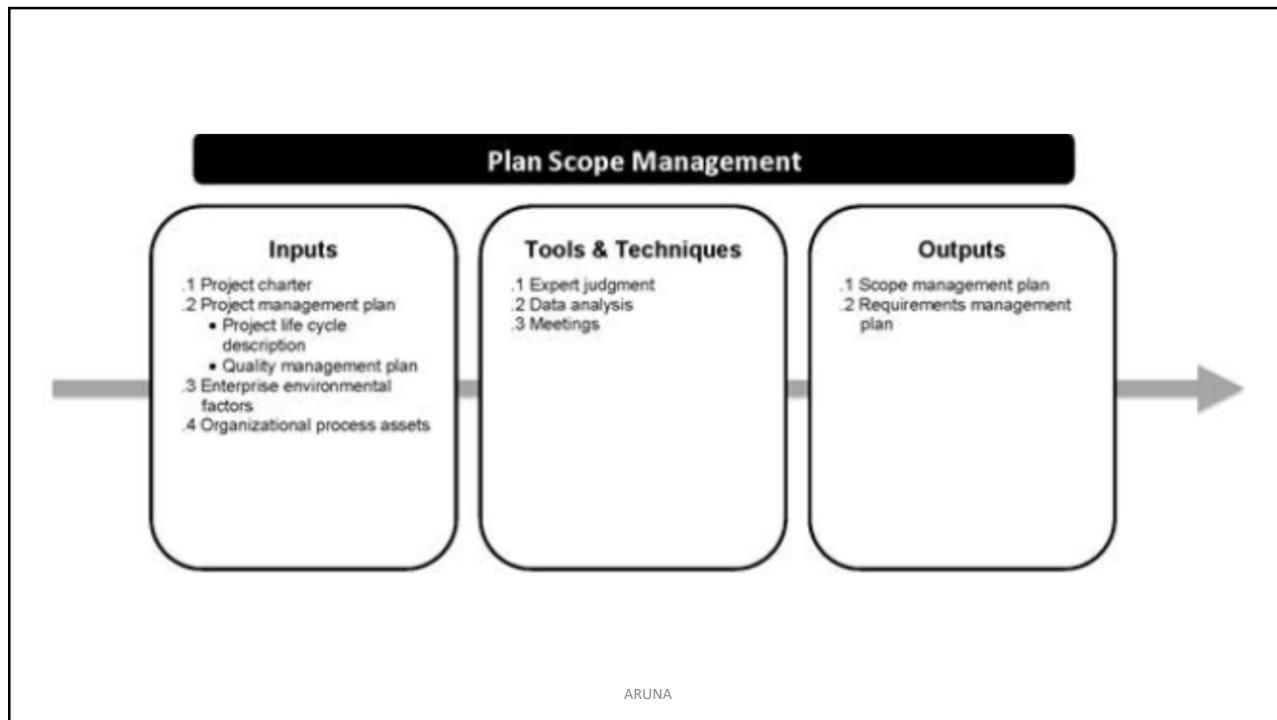
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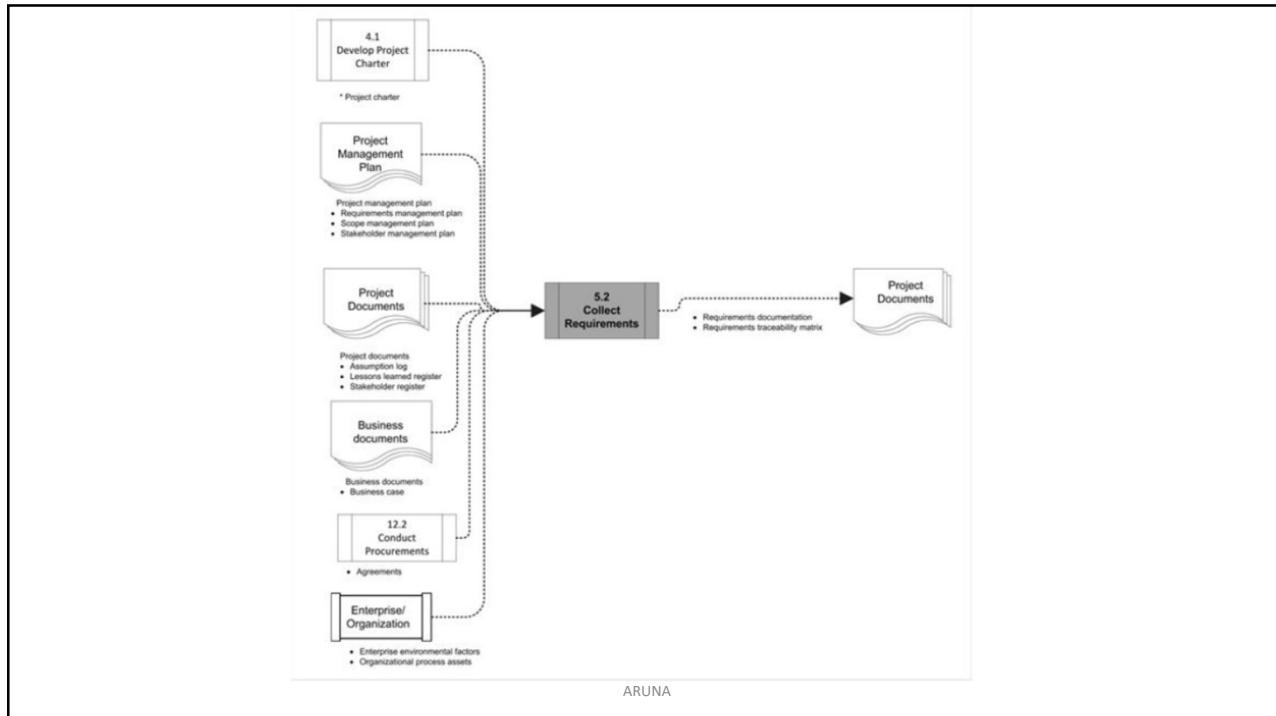
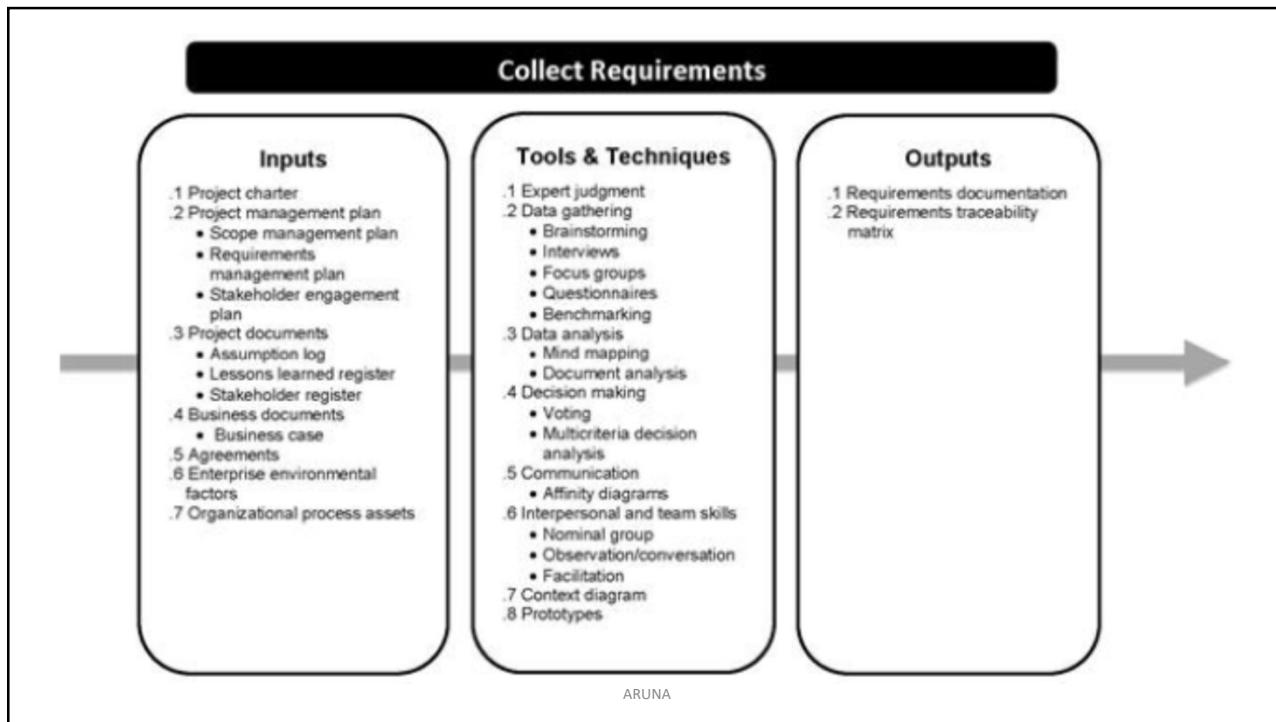
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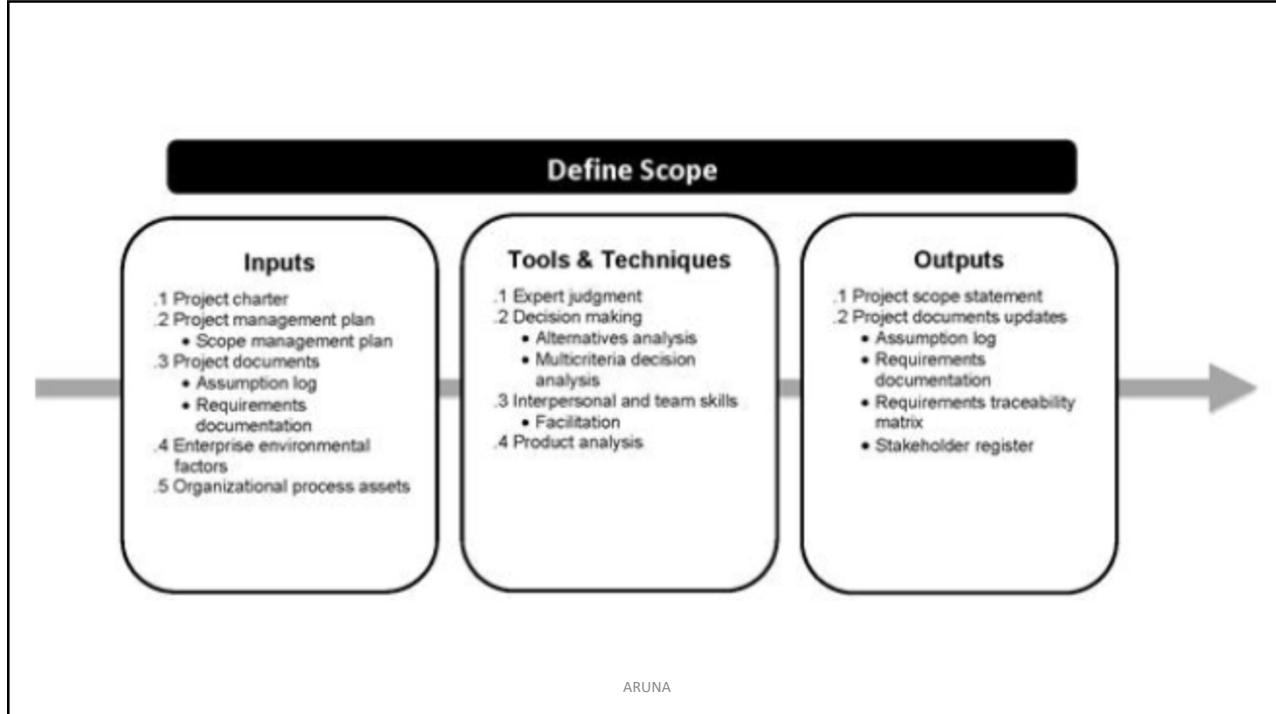
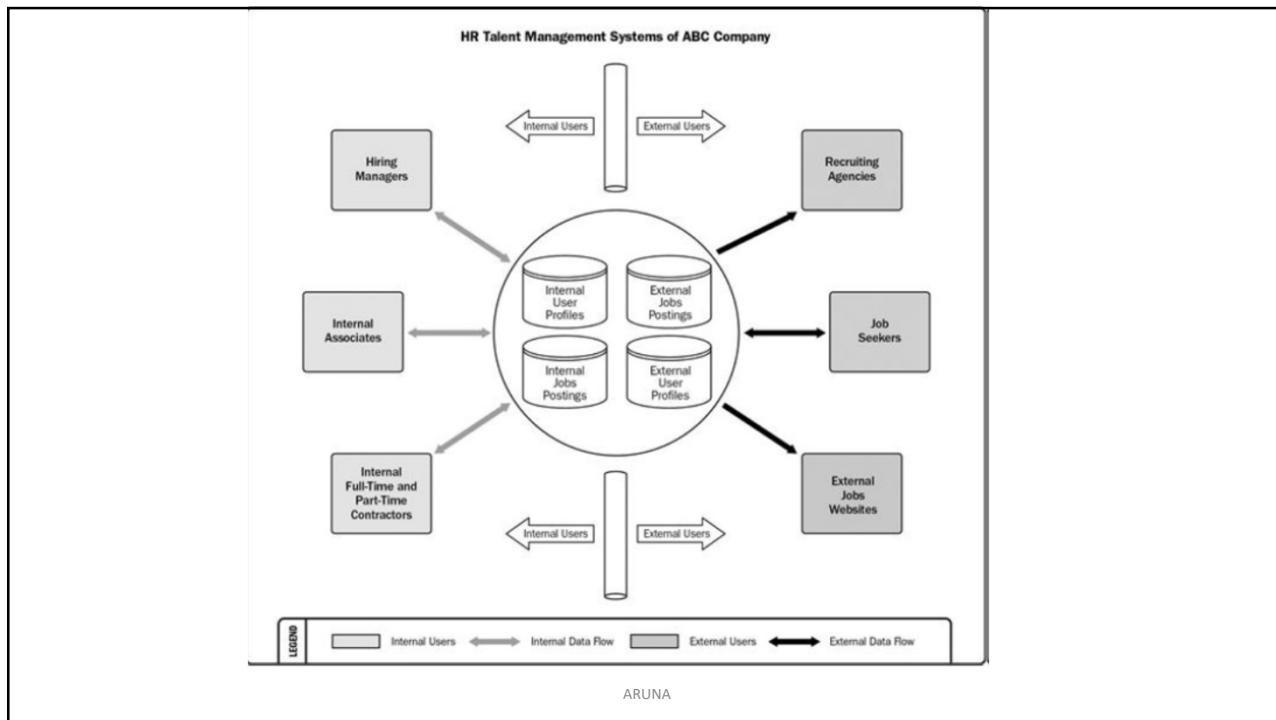


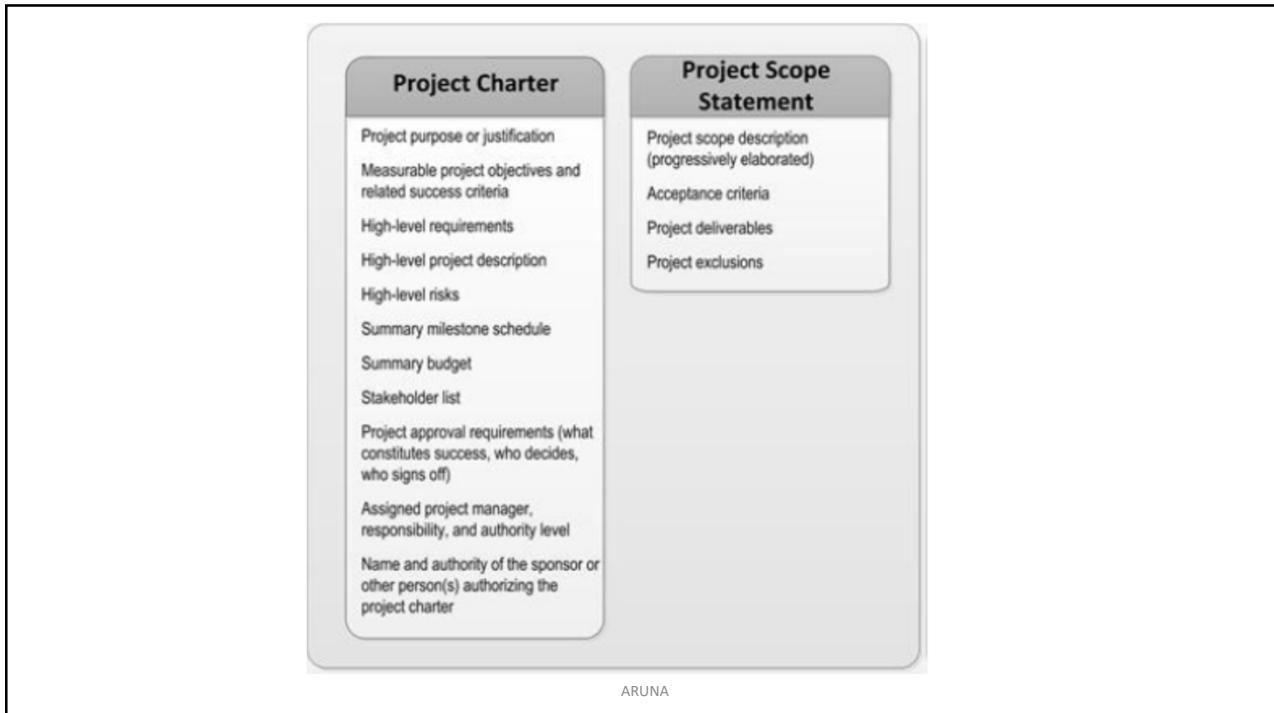
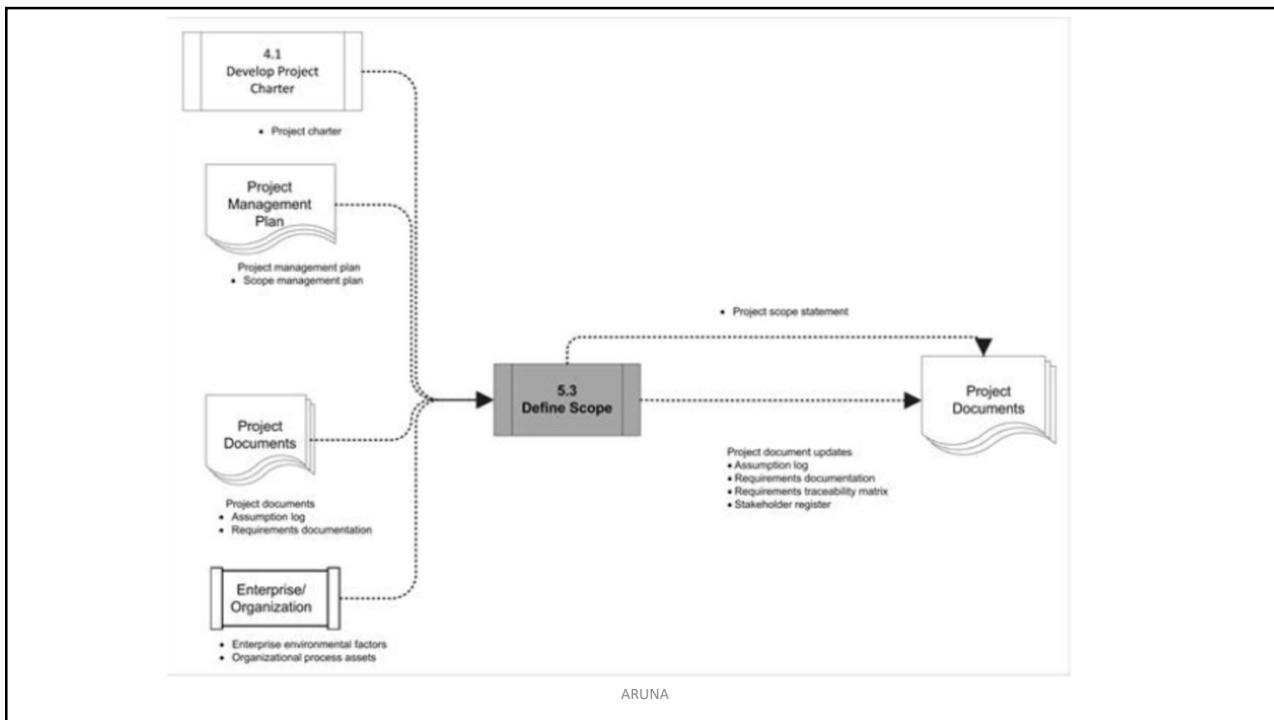


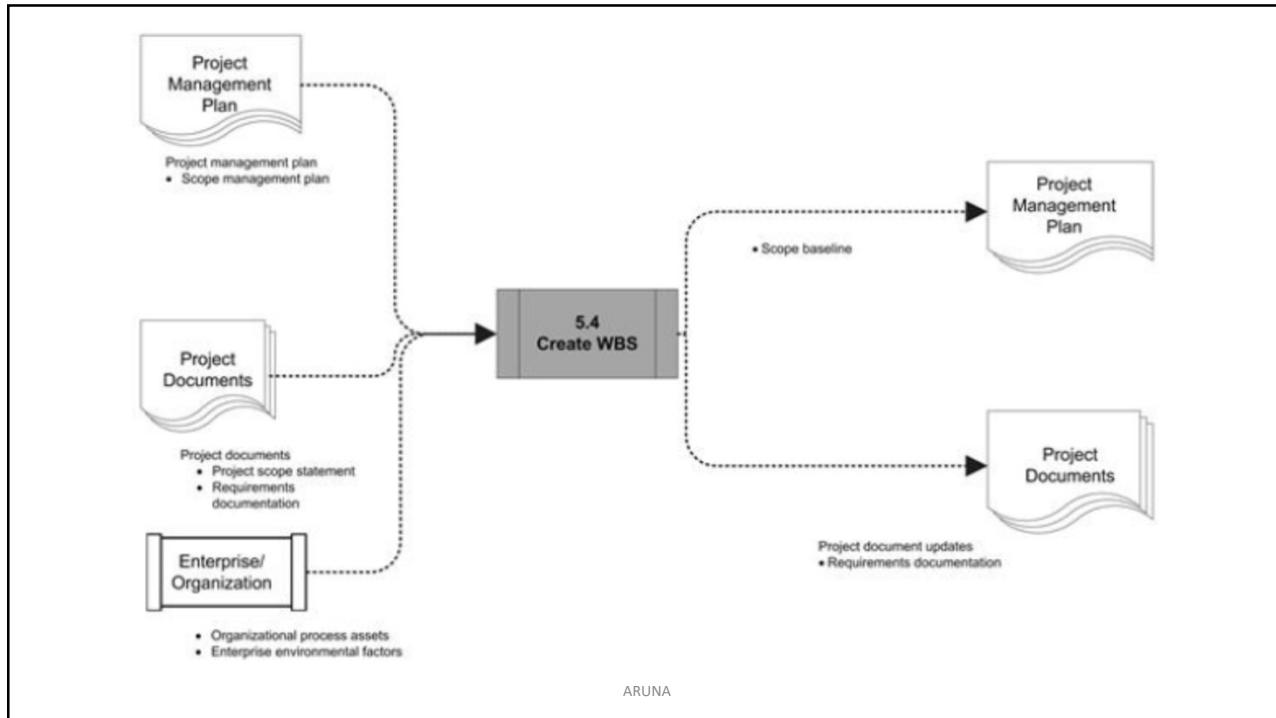
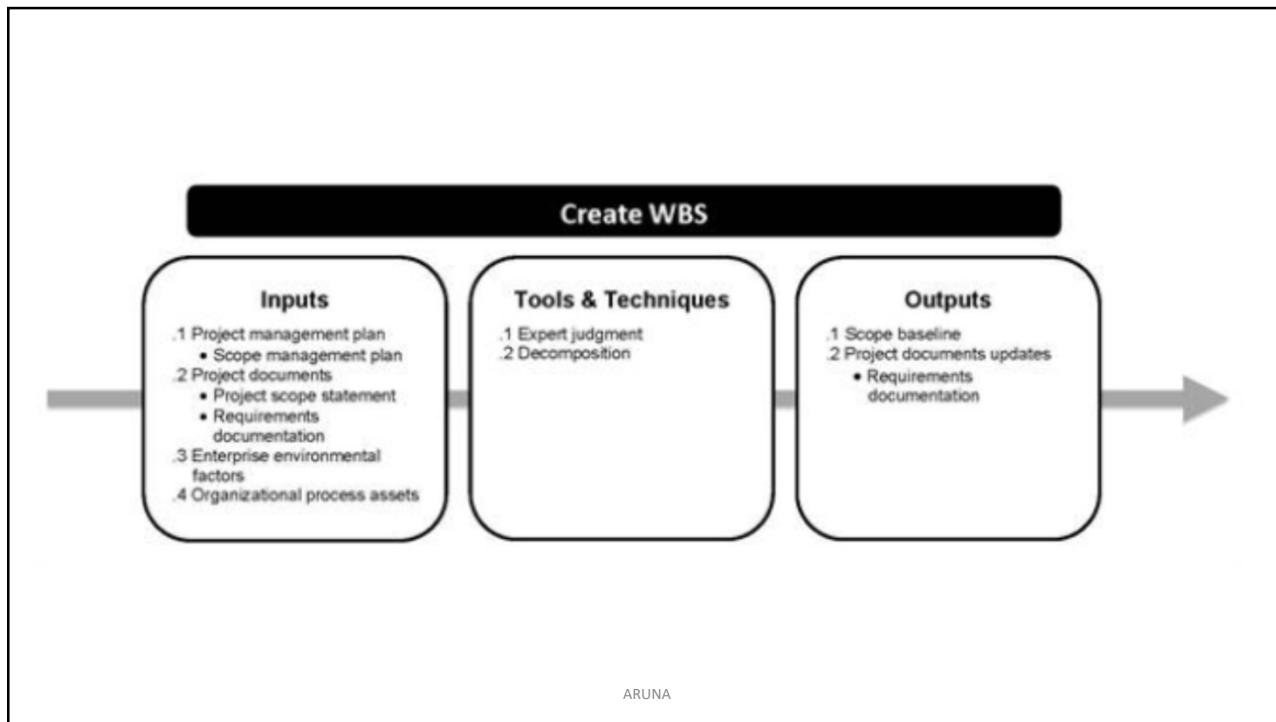












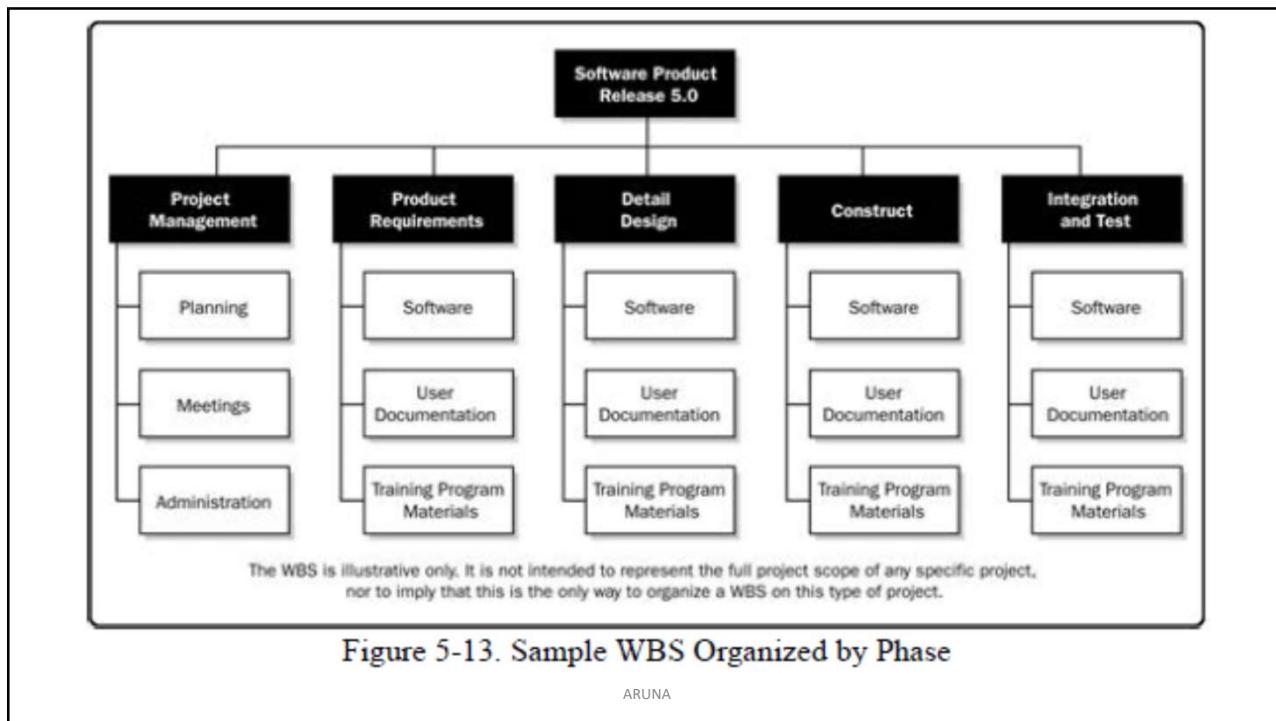
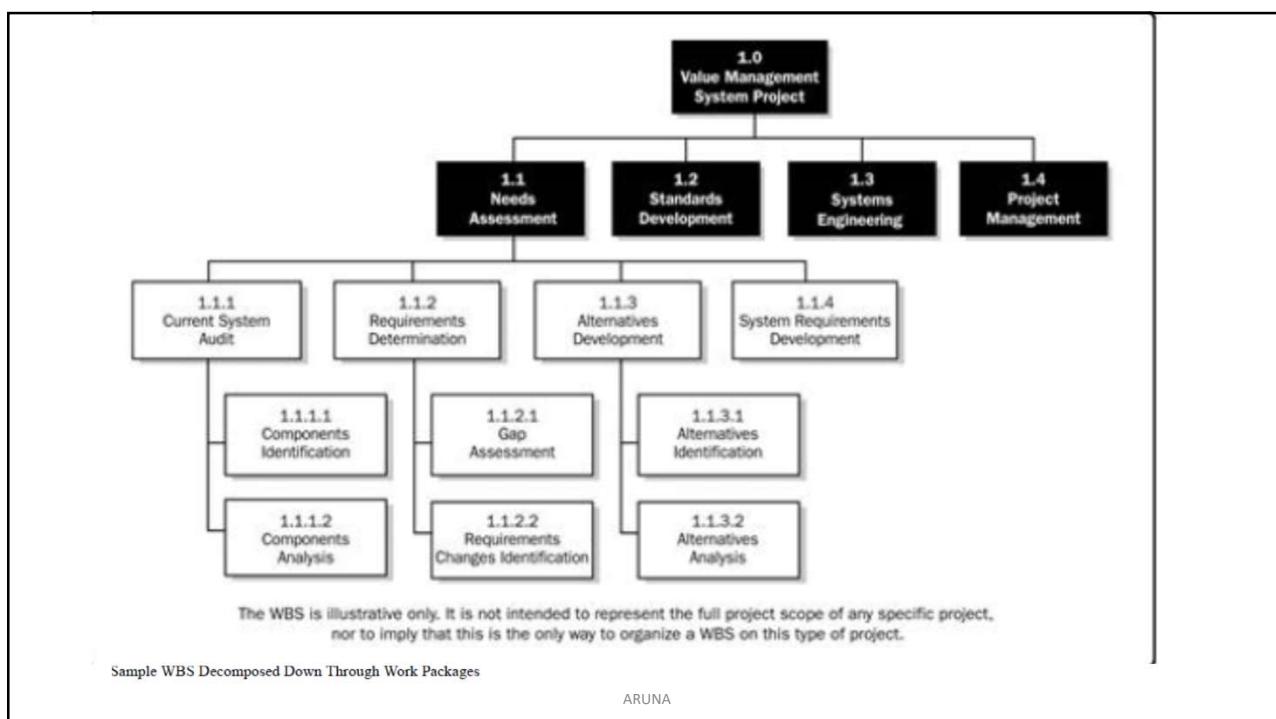
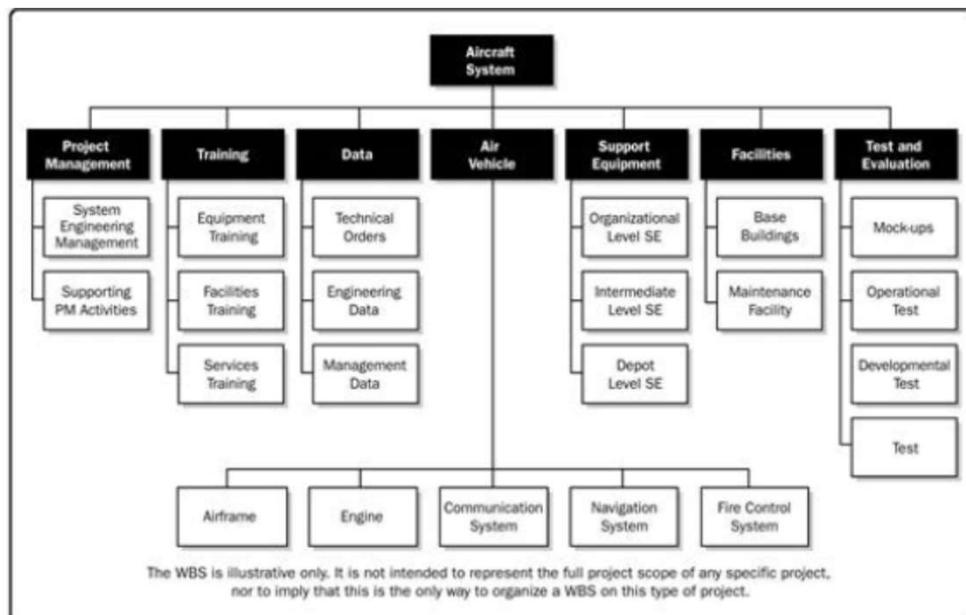


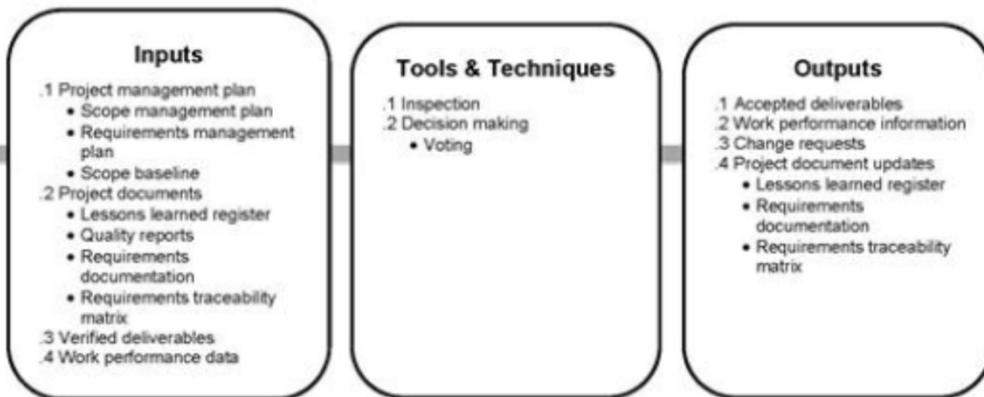
Figure 5-13. Sample WBS Organized by Phase



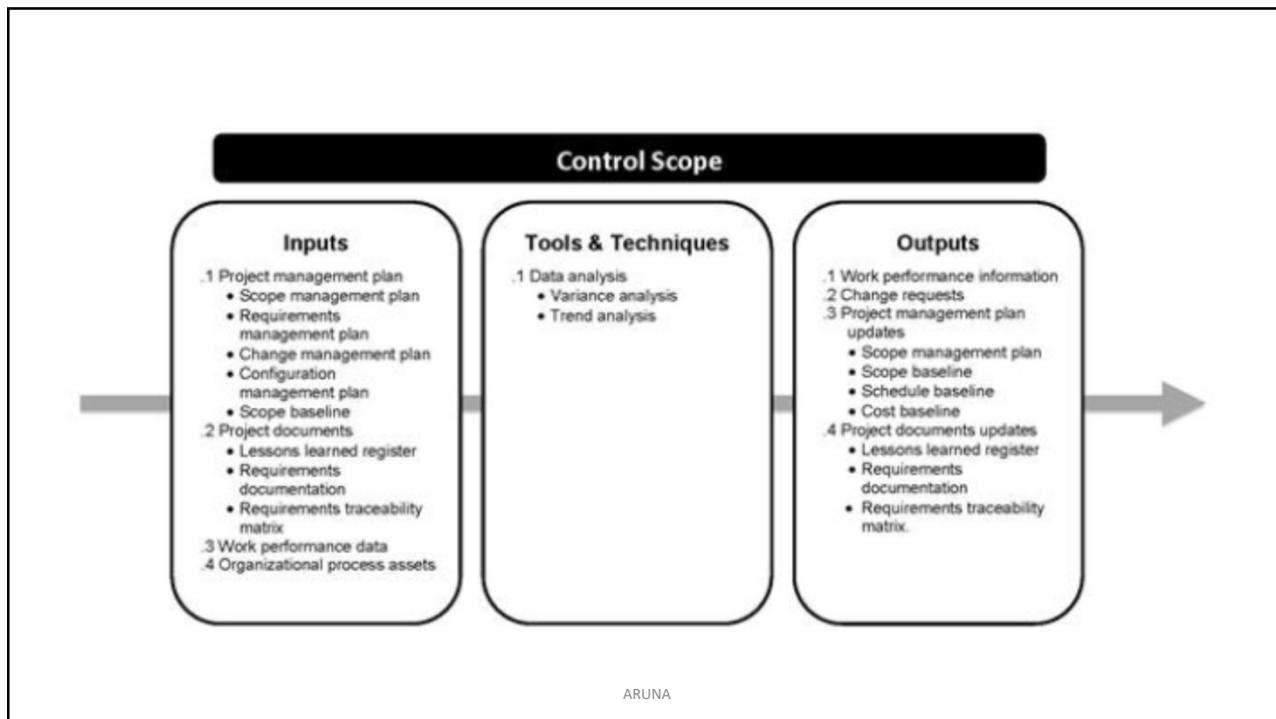
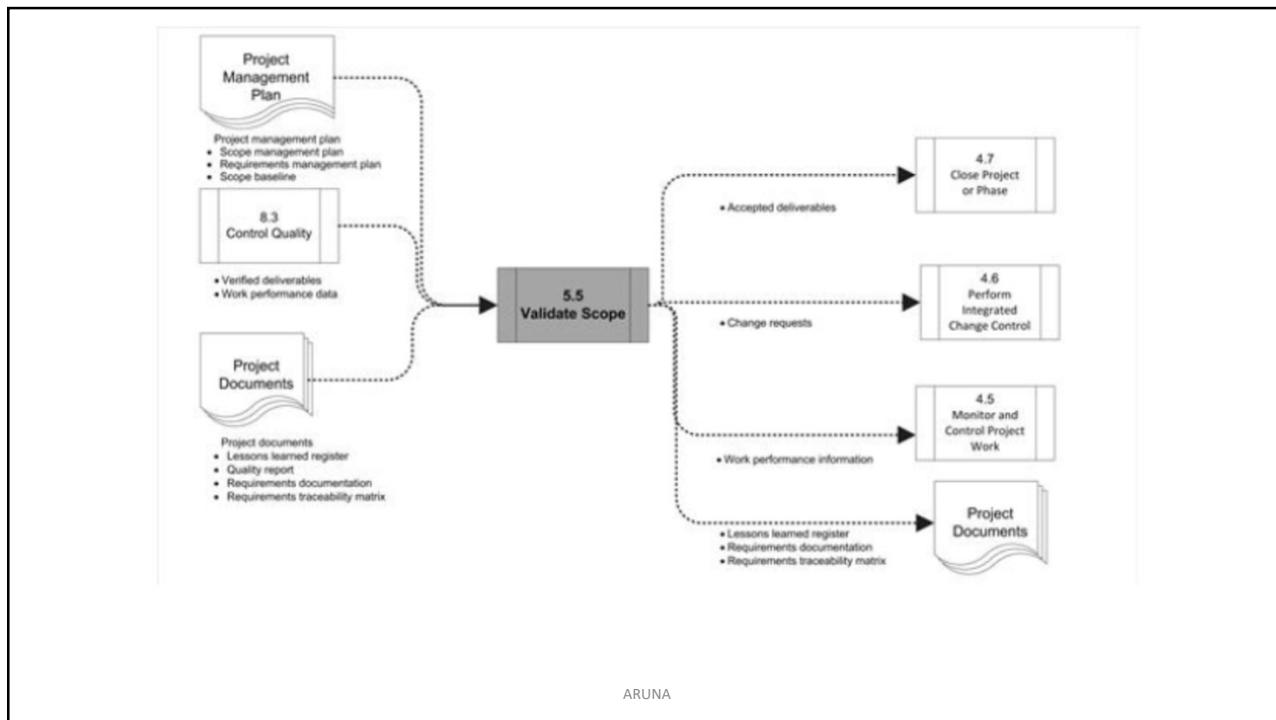
Sample WBS with Major Deliverables

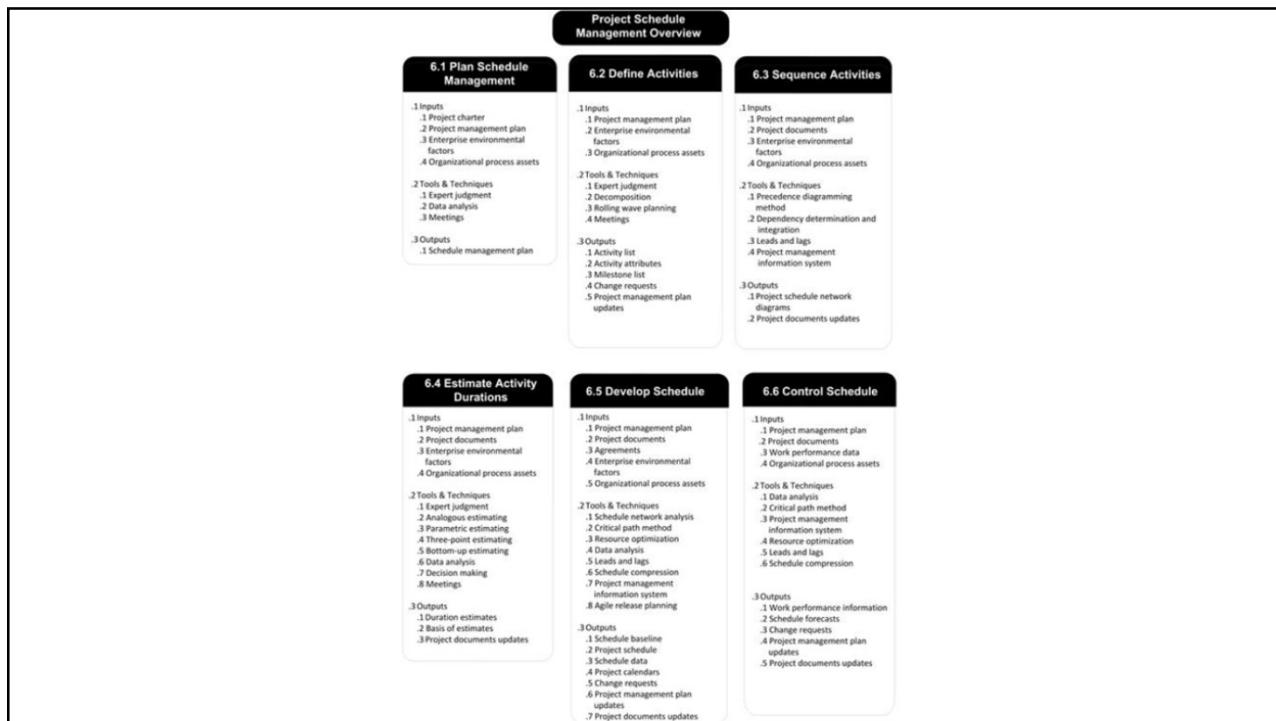
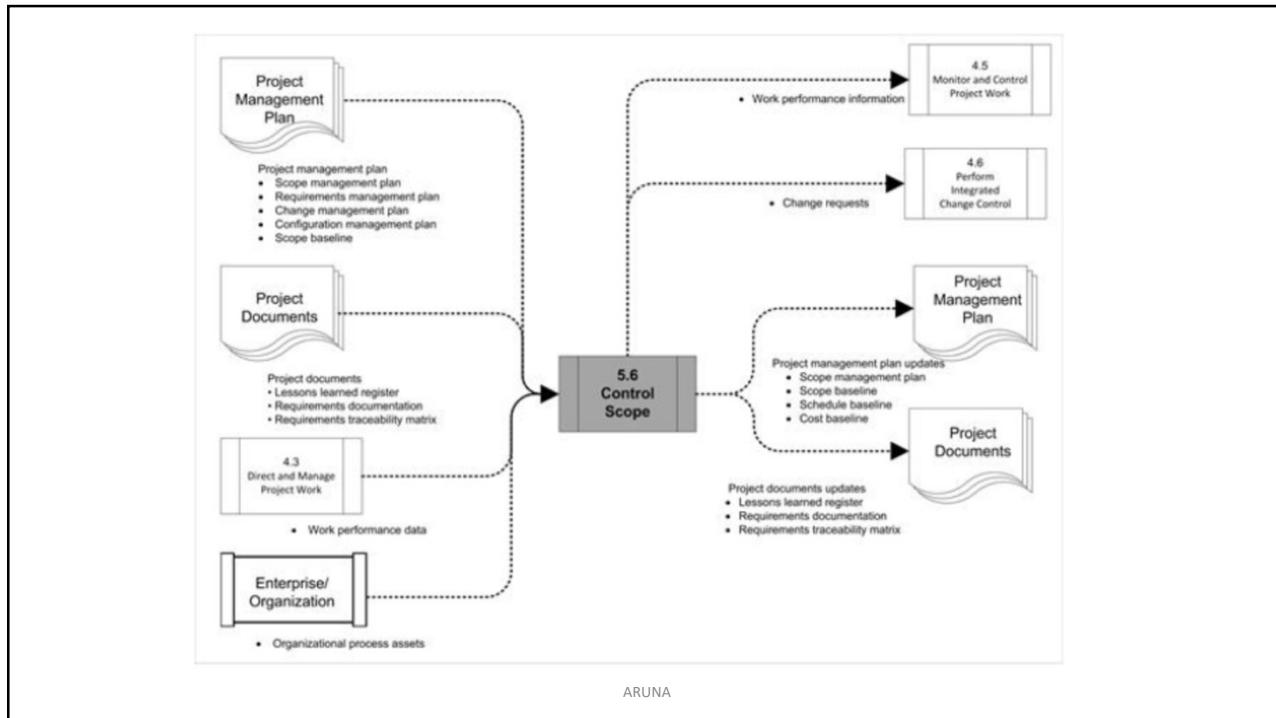
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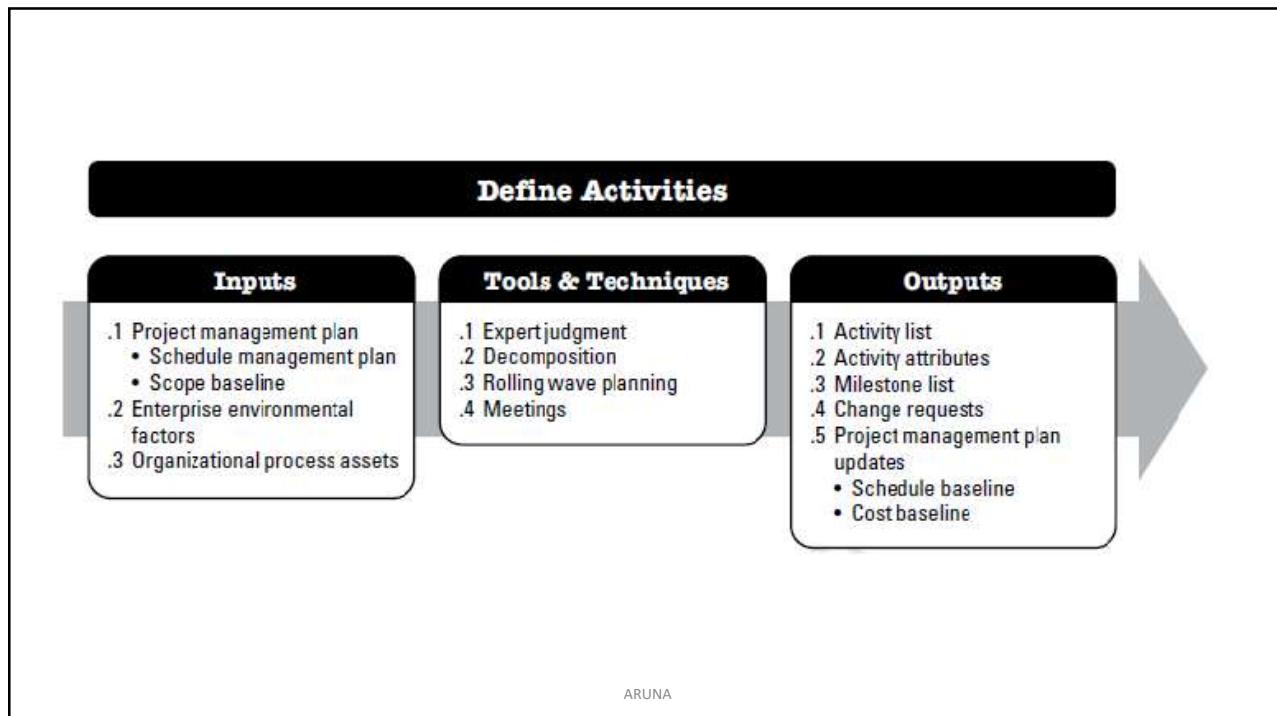
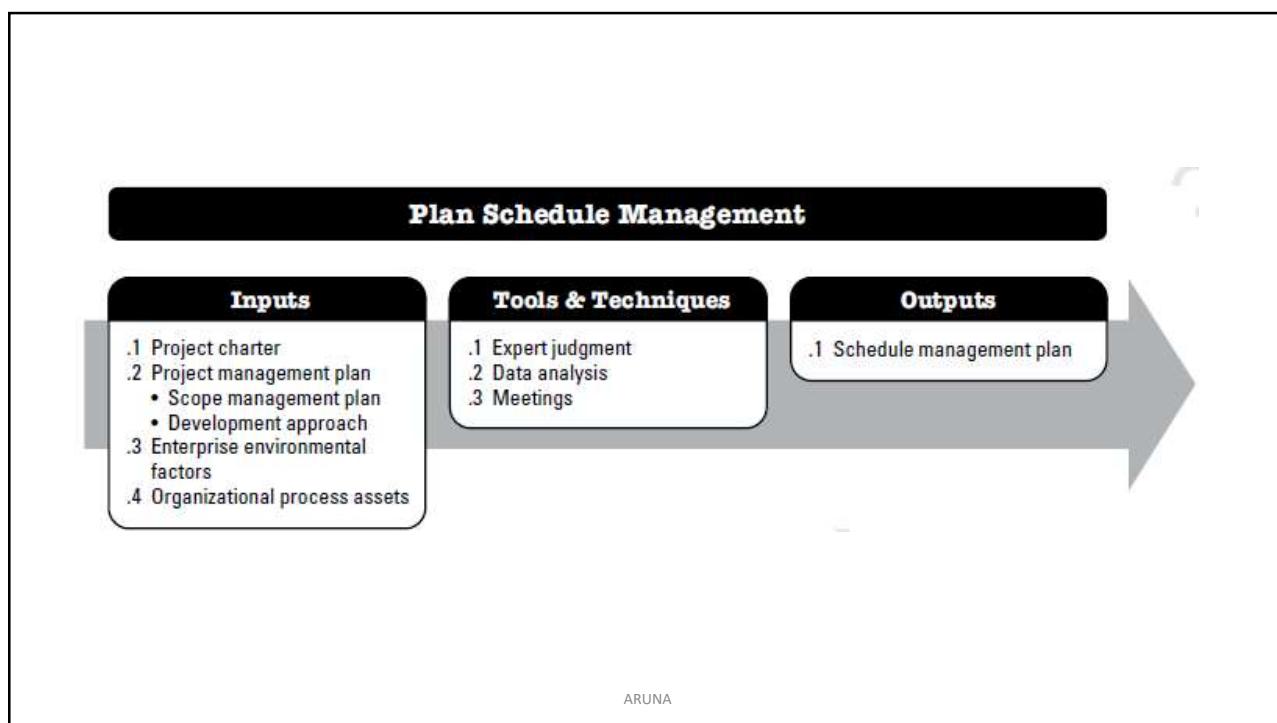
### Validate Scope

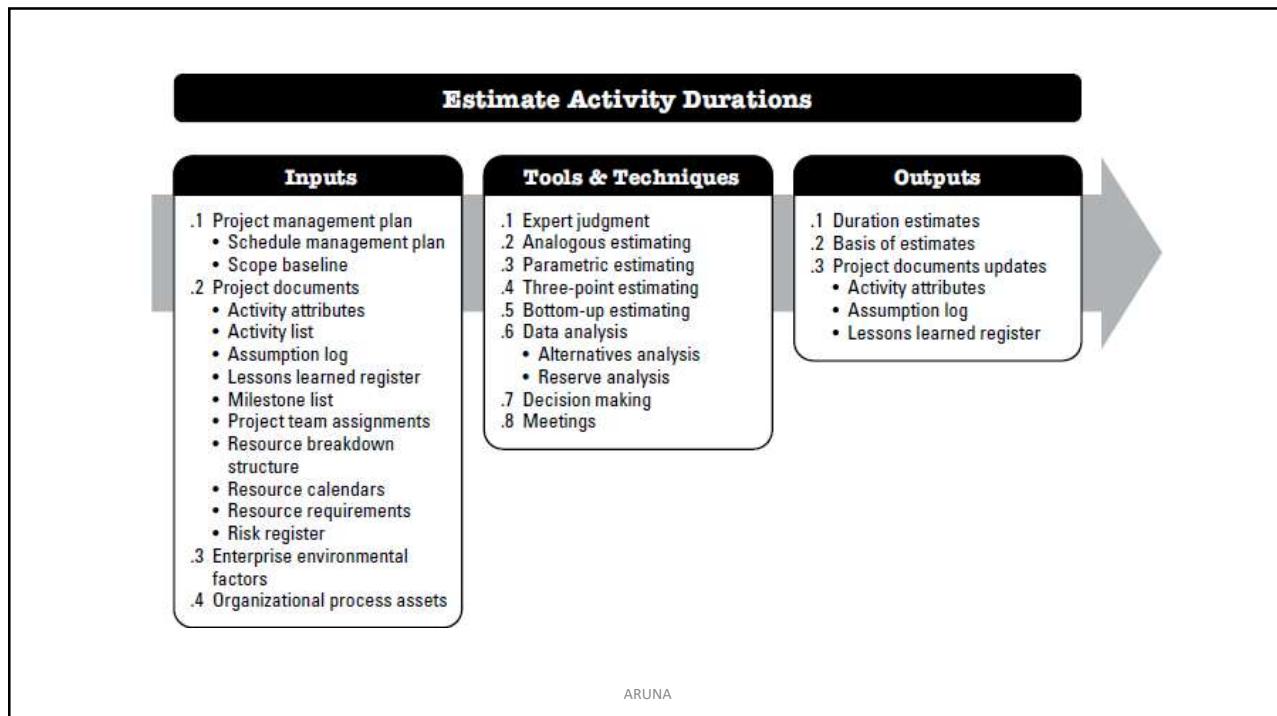
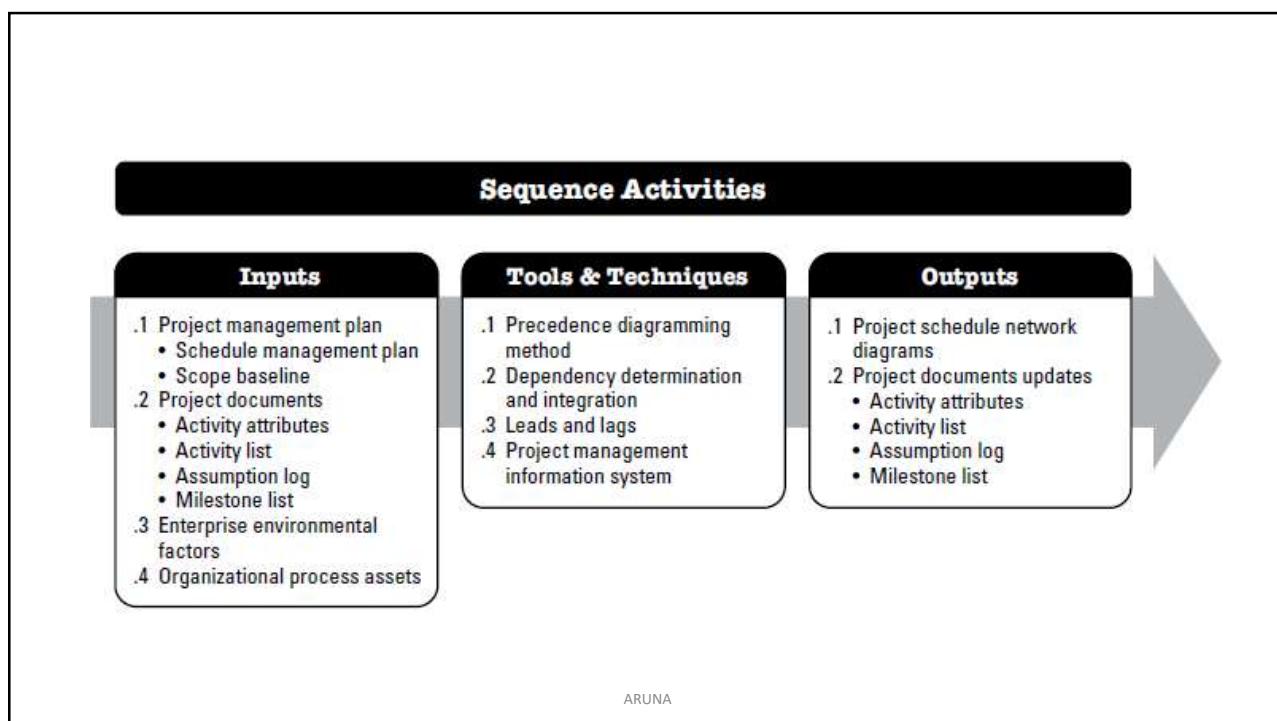


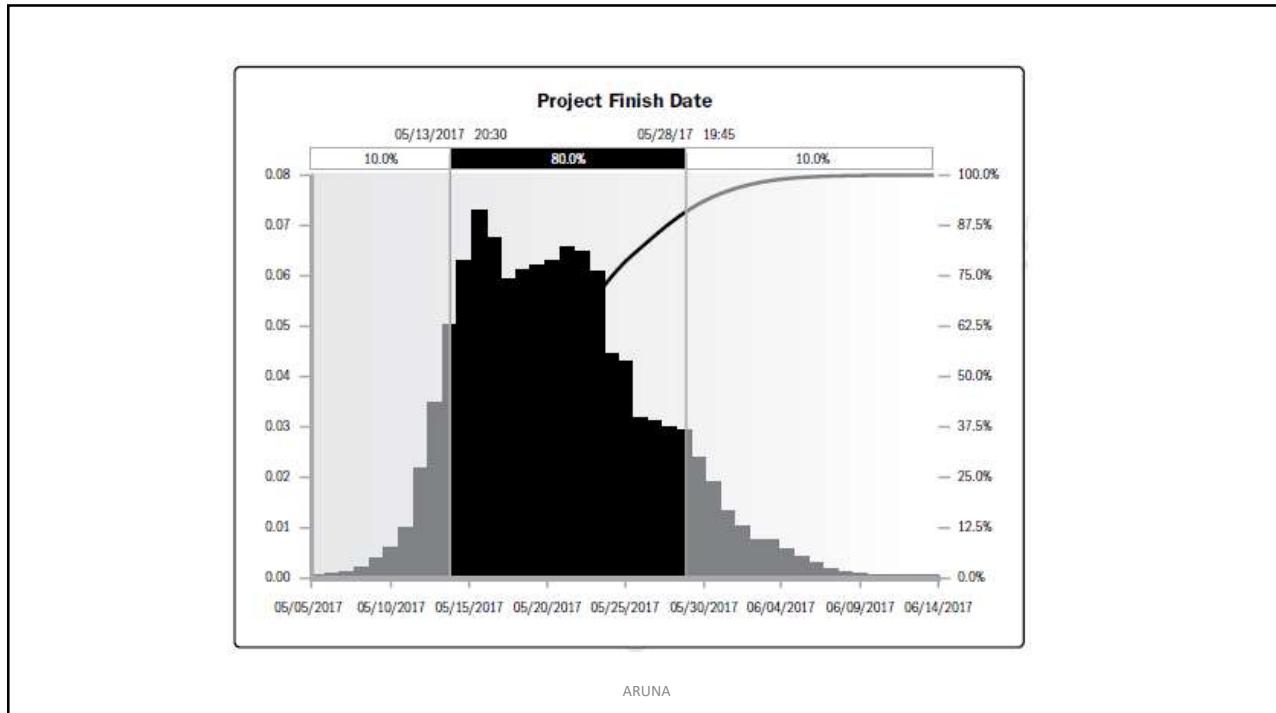
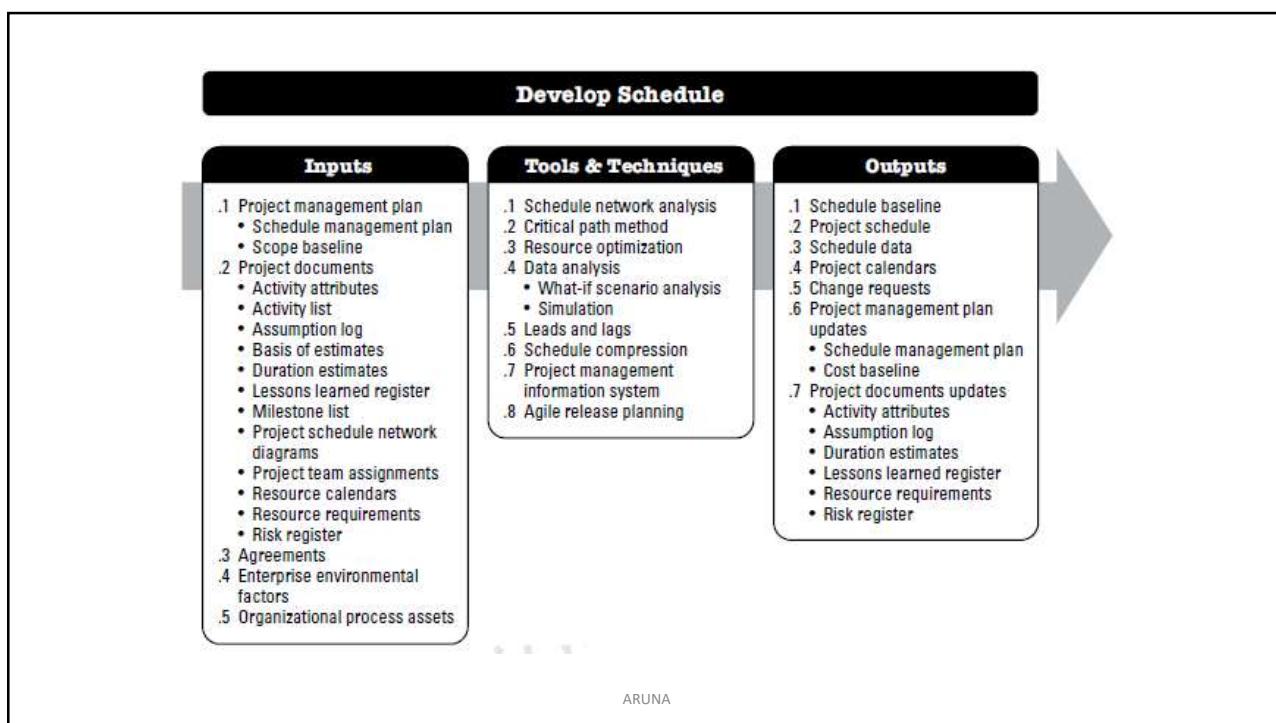
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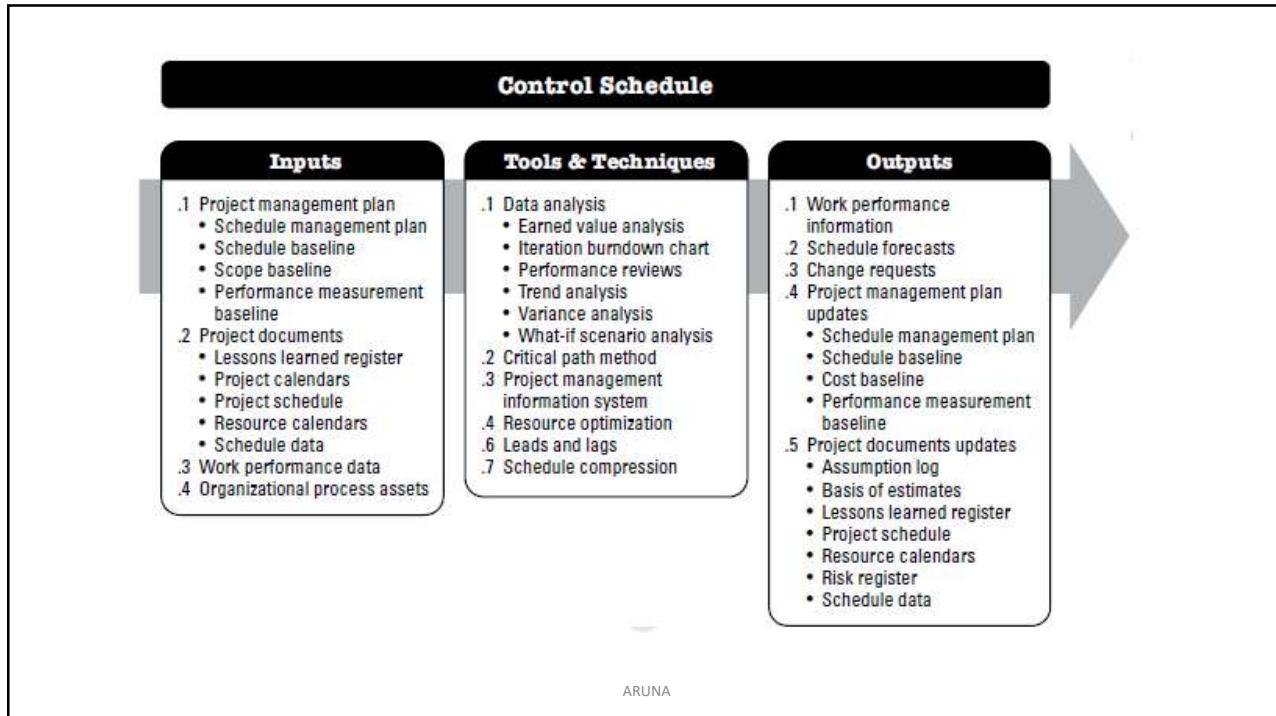
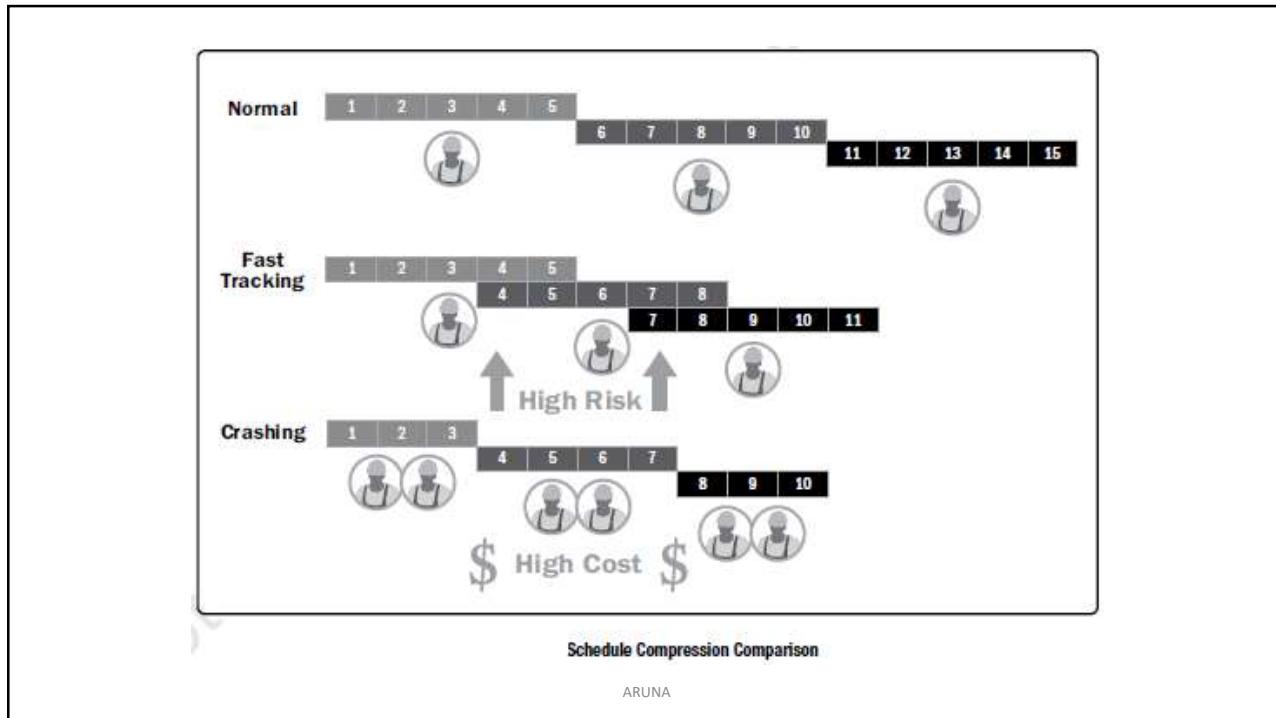












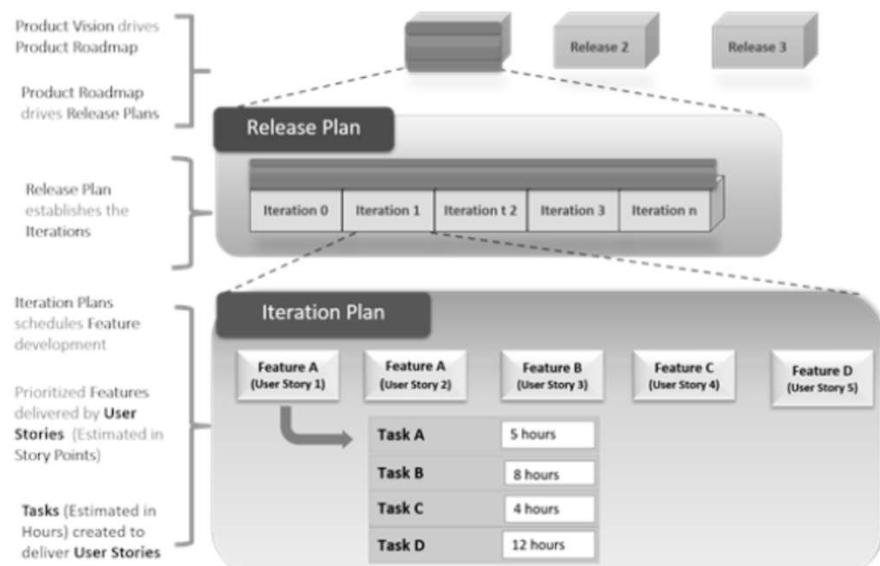


Figure 6-20. Relationship Between Product Vision, Release Planning, and Iteration Planning

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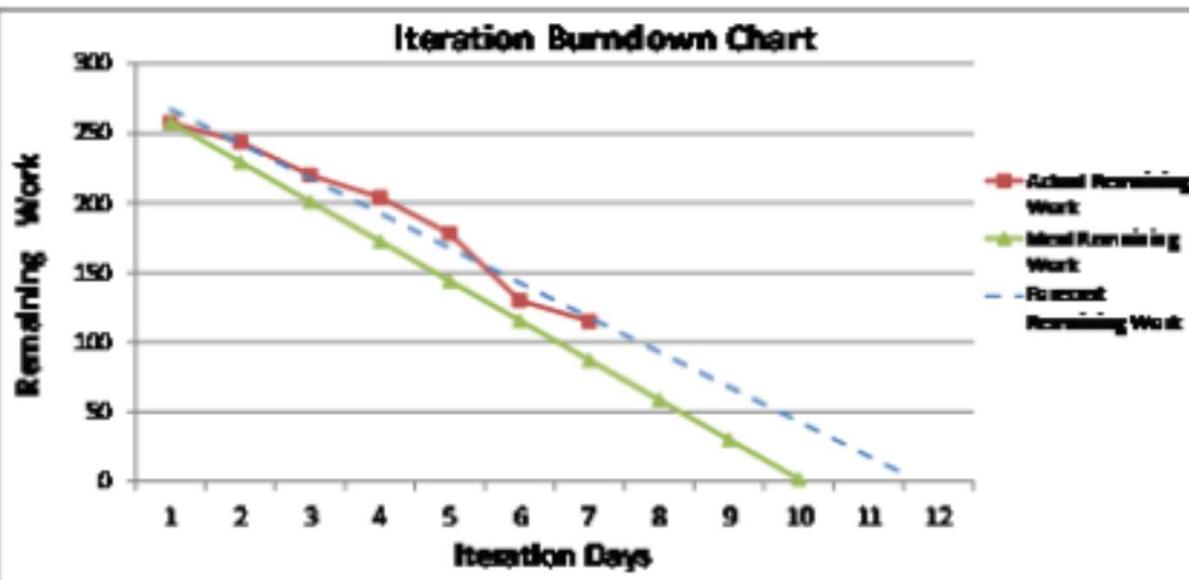


Figure 6-24 Iteration Burndown Chart

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Project Management Process Group and Knowledge Area Mapping						
Knowledge Areas	Project Management Process Groups					
	Initiating Process Group	Planning Process Group	Executing Process Group	Monitoring and Controlling Process Group	Closing Process Group	
4. Project Integration Management	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage Project Work	4.4 Manage Project Knowledge	4.5 Monitor and Control Project Work	4.6 Perform Integrated Change Control
5. Project Scope Management	5.1 Plan Scope Management	5.2 Collect Requirements	5.3 Define Scope	5.4 Create WBS	5.5 Validate Scope	5.6 Control Scope
6. Project Schedule Management	6.1 Plan Schedule Management	6.2 Define Activities	6.3 Sequence Activities	6.4 Estimate Activity Durations	6.5 Develop Schedule	6.6 Control Schedule
7. Project Cost Management	7.1 Plan Cost Management	7.2 Estimate Costs	7.3 Determine Budget		7.4 Control Costs	
8. Project Quality Management	8.1 Plan Quality Management	8.2 Manage Quality	8.3 Control Quality			
9. Project Resource Management	9.1 Plan Resource Management	9.2 Allocate Resources	9.3 Develop Team	9.5 Manage Team	9.6 Control Resources	
10. Project Communications Management	10.1 Plan Communications Management	10.2 Manage Communications	10.3 Monitor Communications			
11. Project Risk Management	11.1 Plan Risk Management	11.2 Identify Risks	11.3 Perform Quantitative Risk Analysis	11.4 Perform Qualitative Risk Analysis	11.5 Plan Risk Responses	11.6 Implement Risk Responses
12. Project Procurement Management	12.1 Plan Procurement Management	12.2 Conduct Procurements	12.3 Control Procurements			
13. Project Stakeholder Management	13.1 Identify Stakeholders	13.2 Plan Stakeholder Engagement	13.3 Manage Stakeholder Engagement	13.4 Monitor Stakeholder Engagement		

