ROYAL UNIVERSITY OF PHNOM PENH

IT Project Management

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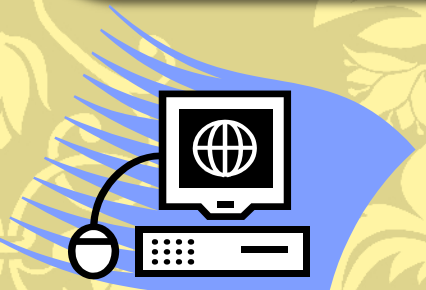
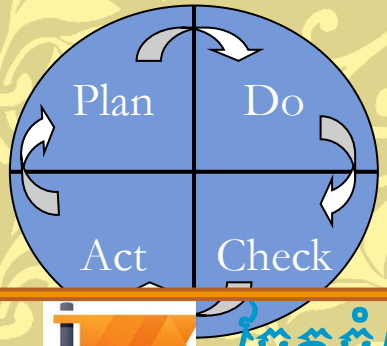
Chapter 3
Project Scope Management





Learning Objective

- Understand the elements that make good project scope management important
- Explain the scope planning process and describe the contents of a scope management plan
- Describe the process for developing a project scope statement
- Discuss the scope definition process and a WBS using the analogy, top-down, bottom-up, and mind-mapping approaches
- Understand the elements that make good project scope management important

What is Project Scope Management?

- **Scope** refers to *all* the work involved in **creating the products** of the project and the processes used to create them
- A **deliverable** is a product produced as part of a project, such as hardware or software, planning documents, or meeting minutes
- The project team and stakeholders must have **the same understanding of what products will be produced** as a result of a project and how they'll be produced
- Project scope management includes the **processes** involved in defining and controlling what is or is not included in a project

What is Project Scope Management?

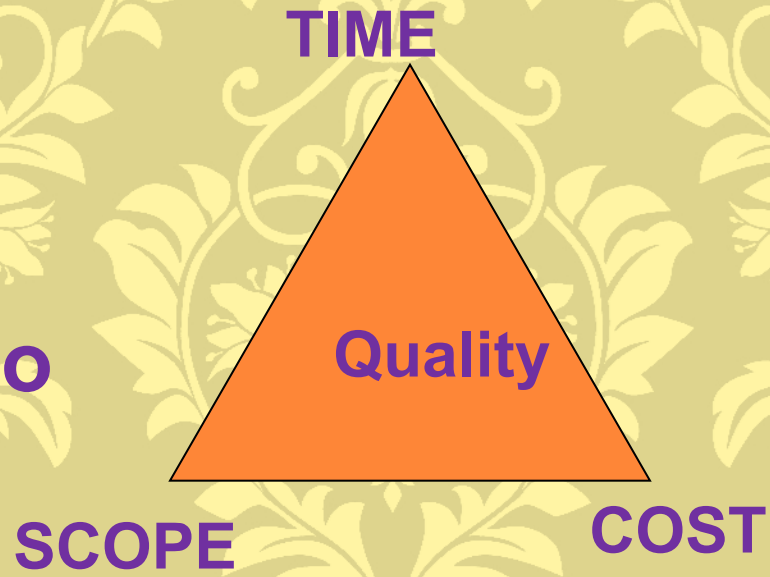
- "The processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully"
- Answers the question – **"What will the project produce in the end"**.

What is Project Scope Management?

- ***Initiation:*** beginning a project or continuing to the next phase
- ***Scope planning:*** developing documents to provide the basis for future project decisions
- ***Scope definition:*** subdividing the major project deliverables into smaller, more manageable components
- ***Scope verification:*** formalizing acceptance of the project scope
- ***Scope change control:*** controlling changes to project scope

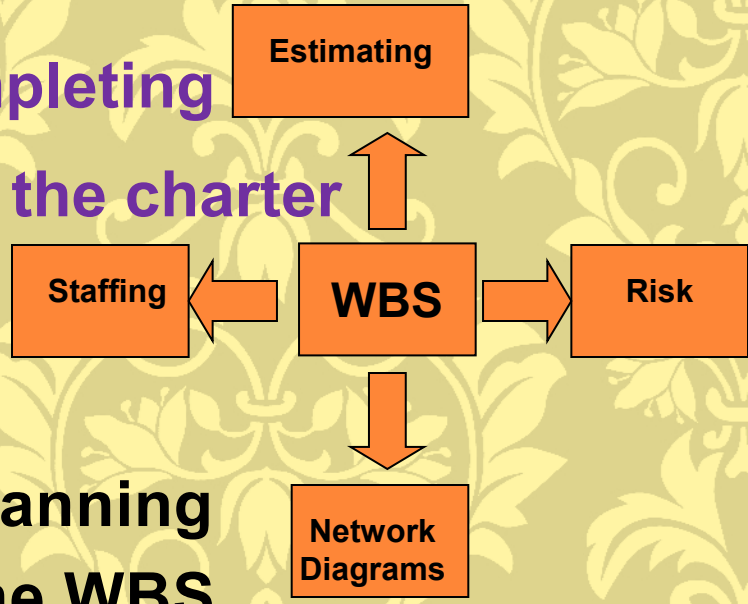
Why do we manage scope?

- Can't manage schedule and budget if scope is out of control (Triple Constraint)
- Scope docs are **used to manage expectations**



Scope Management Key Points

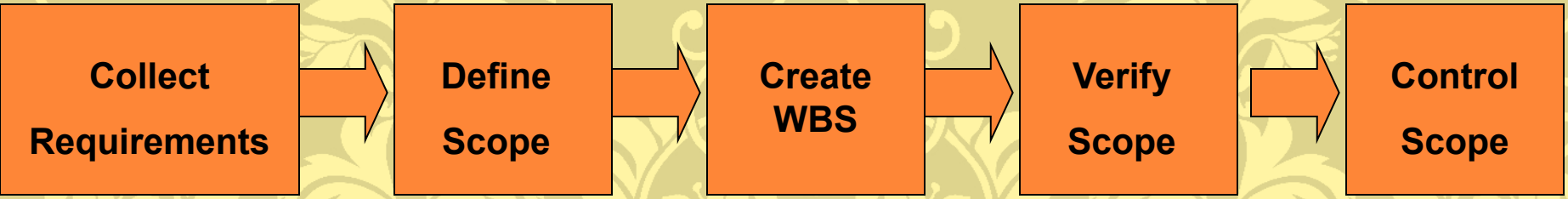
- What is scope management?
- Checking to ensure that one is completing
- Saying No to additional work not in the charter
- Preventing extra work/gold plating
- Work Breakdown Structure (WBS)
  - Foundation of the project, all planning
  - and controlling is based on the WBS
  - Identifies all work to be performed, if it is not in the WBS it does not need to be done
  - Graphical picture of work



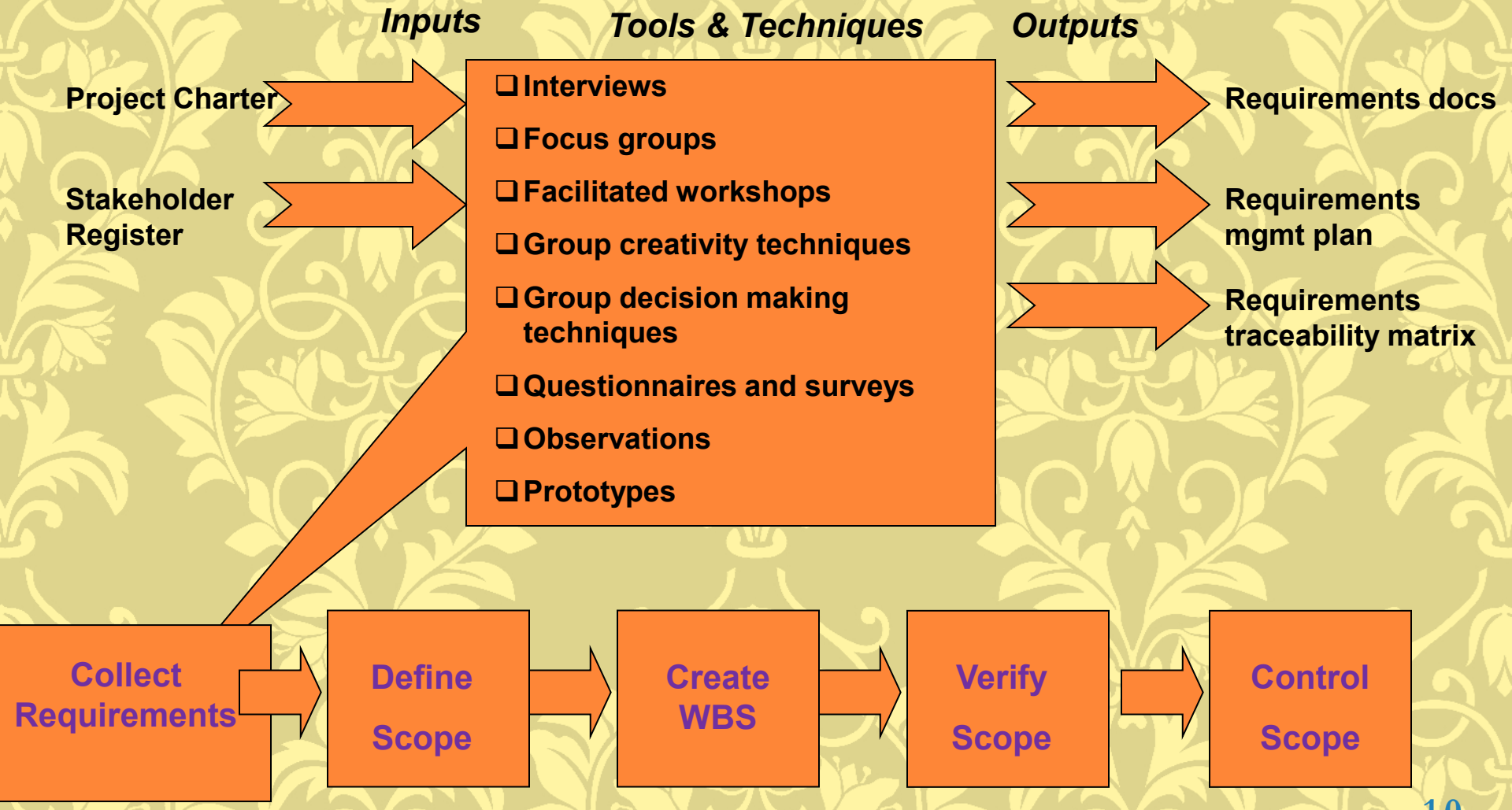
How do we manage Scope?

Five processes

1. *Collect Requirements*
2. *Define Scope*
3. *Create WBS*
4. *Verify Scope*
5. *Control Scope*



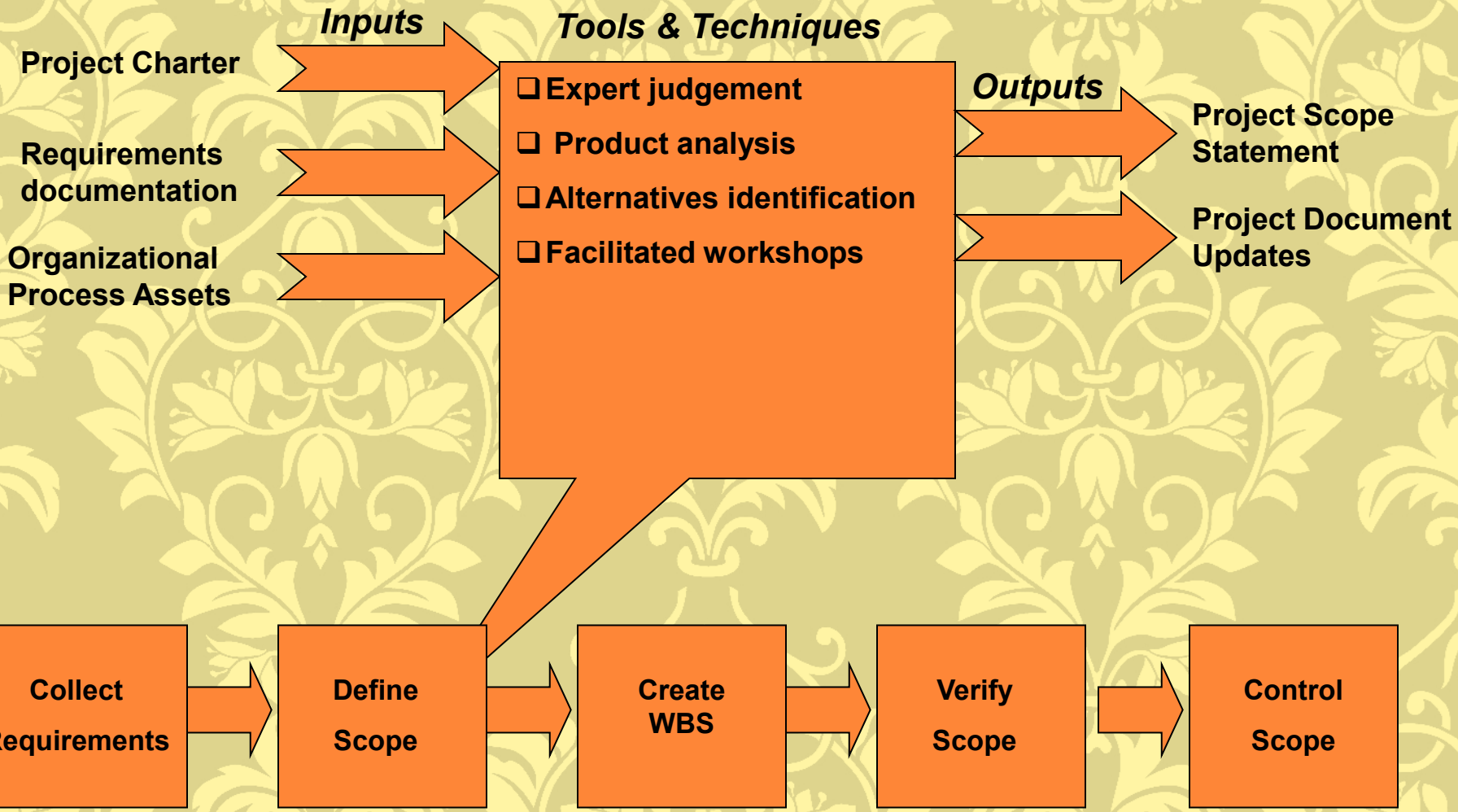
Collect Requirements



Collect Requirements

- Determine product of the project requirements
- Make sure all requirements support the business need of the project as described in the charter

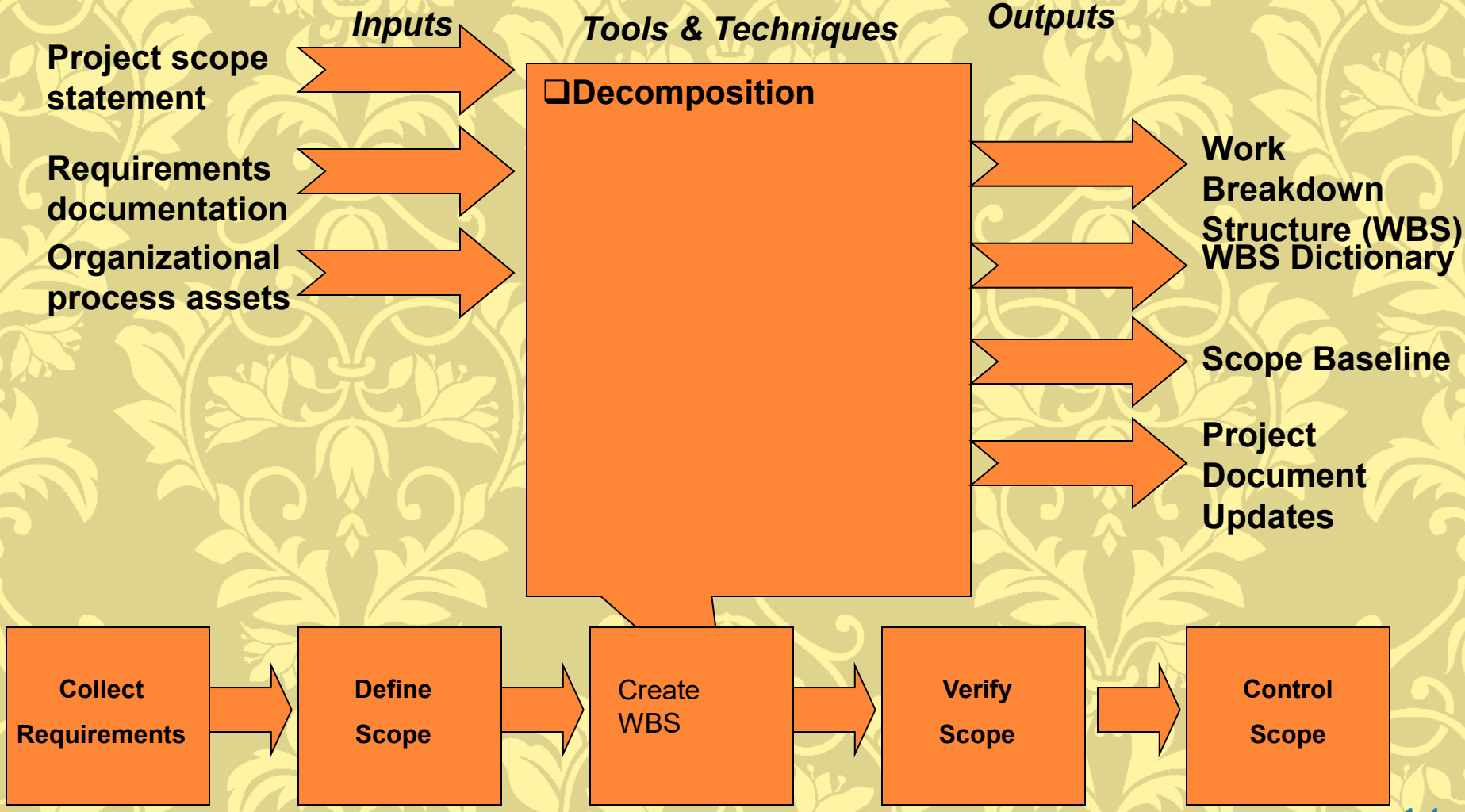
Define Scope



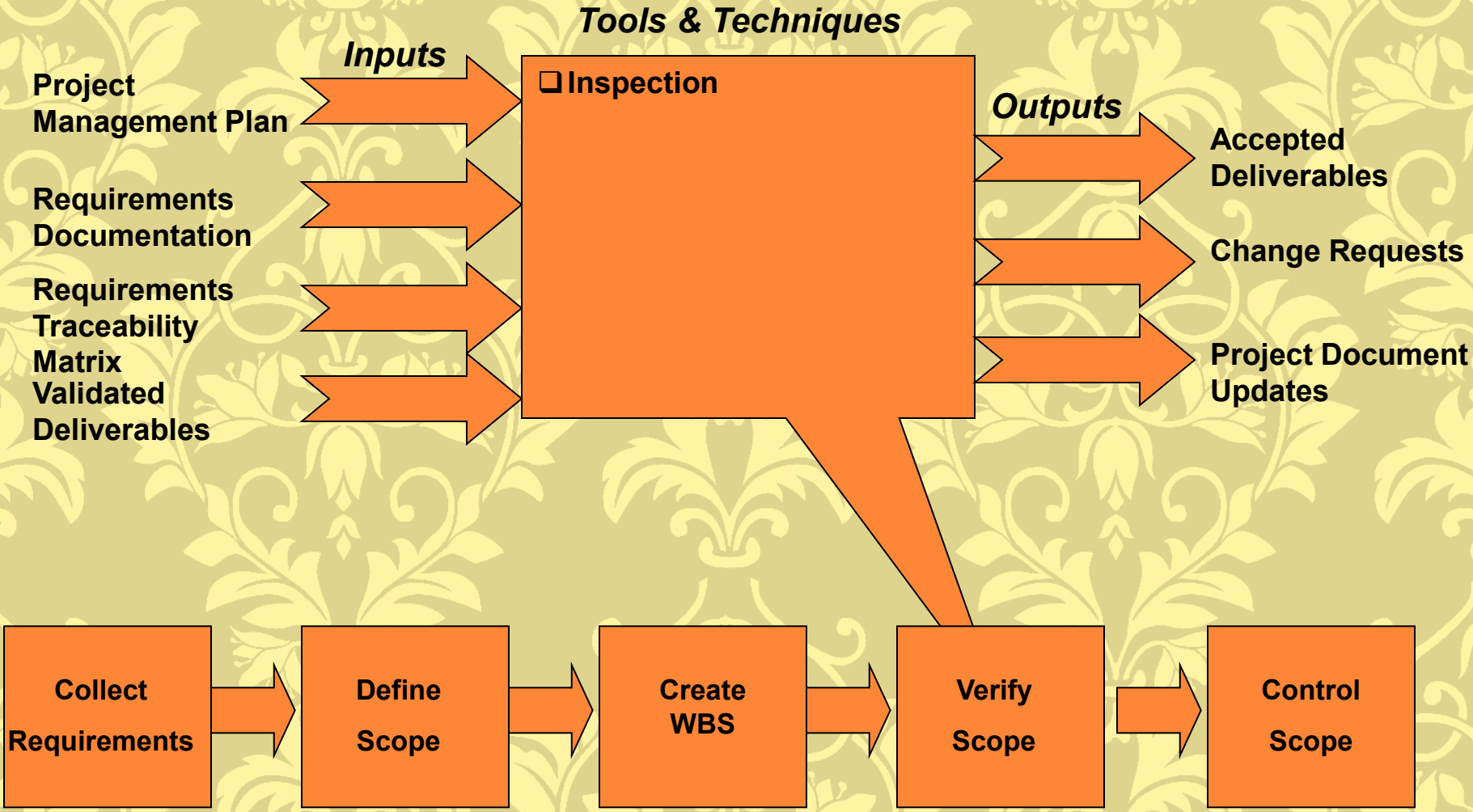
Project Scope Statement

- Product scope description
- Product acceptance criteria
- Project deliverables
- Project exclusions
- Project constraints
- Project assumptions

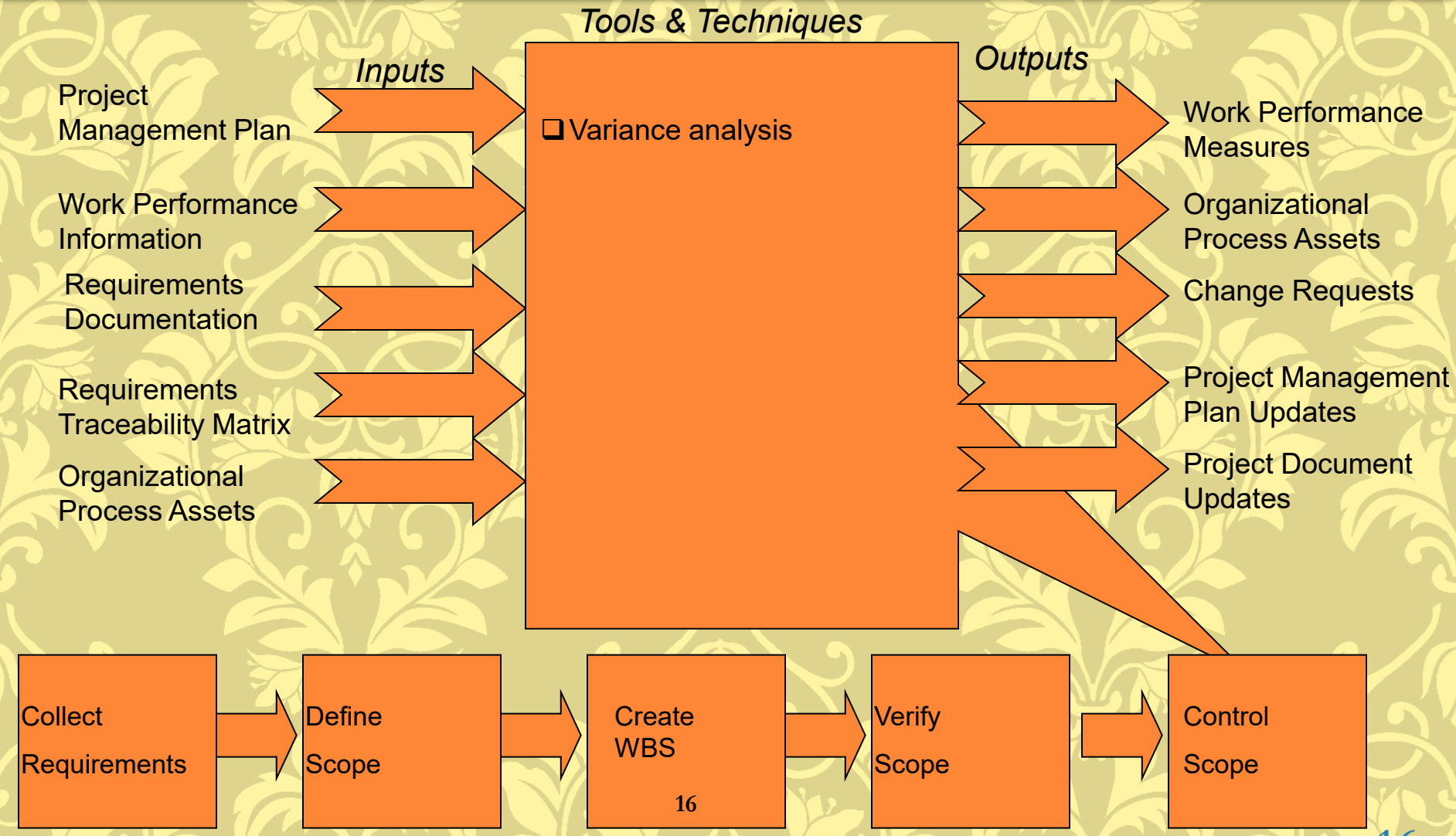
Creating a WBS



Verify Scope



Control Scope



Project Scope Management Process

- *Scope planning:* deciding how the scope will be defined, verified, and controlled
- *Scope definition:* reviewing the project charter and preliminary scope statement and adding more information as requirements are developed and change requests are approved
- *Creating the WBS:* subdividing the major project deliverables into smaller, more manageable components
- *Scope verification:* formalizing acceptance of the project scope
- *Scope control:* controlling changes to project scope

Scope Management Plan

- The **scope management plan** is a document that includes descriptions of how the team will prepare the project scope statement, create the WBS, verify completion of the project deliverables, and control requests for changes to the project scope Key inputs include the project charter, preliminary scope statement, and project management plan

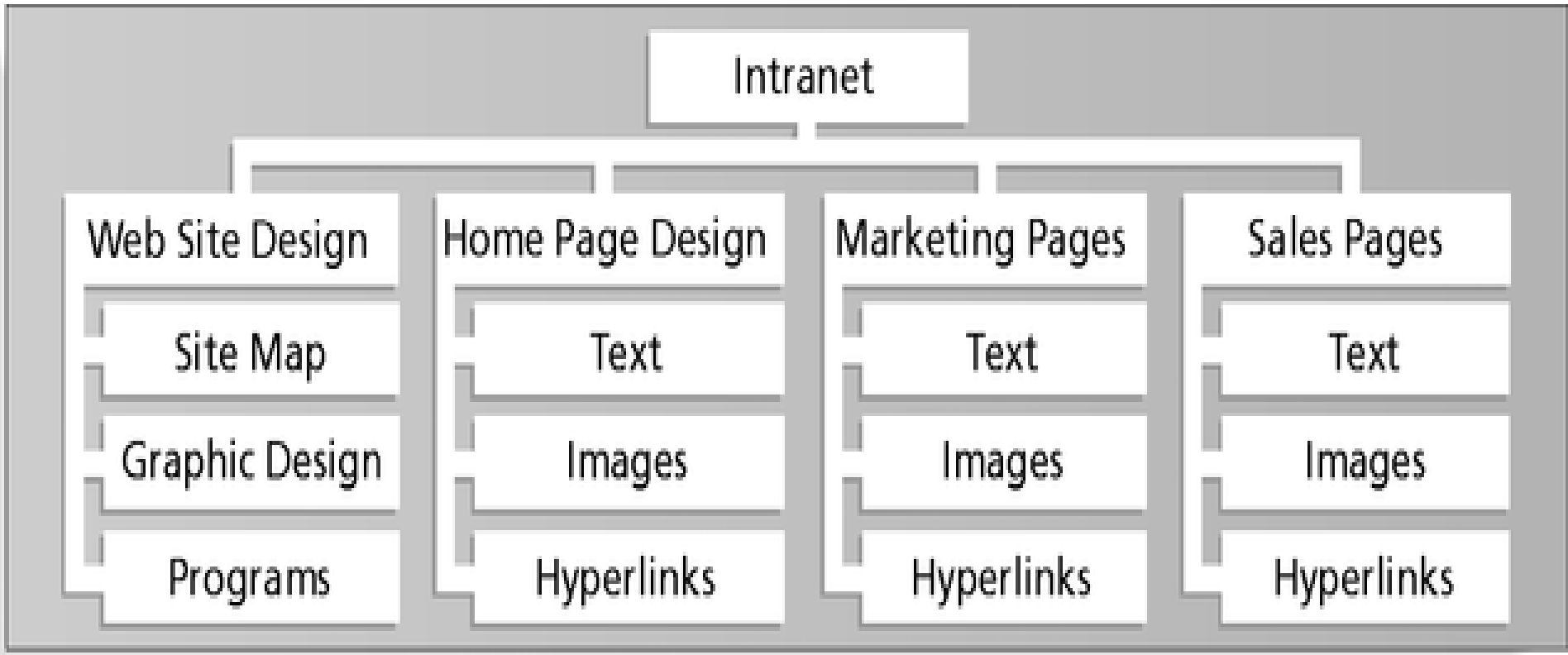
Project Scope Definition

- The project team develops a preliminary scope statement in initiating a project as part of the project integration management knowledge area
- The preliminary scope statement, project charter, organizational process assets, and approved change requests provide a basis for creating the more specific **project scope statement**

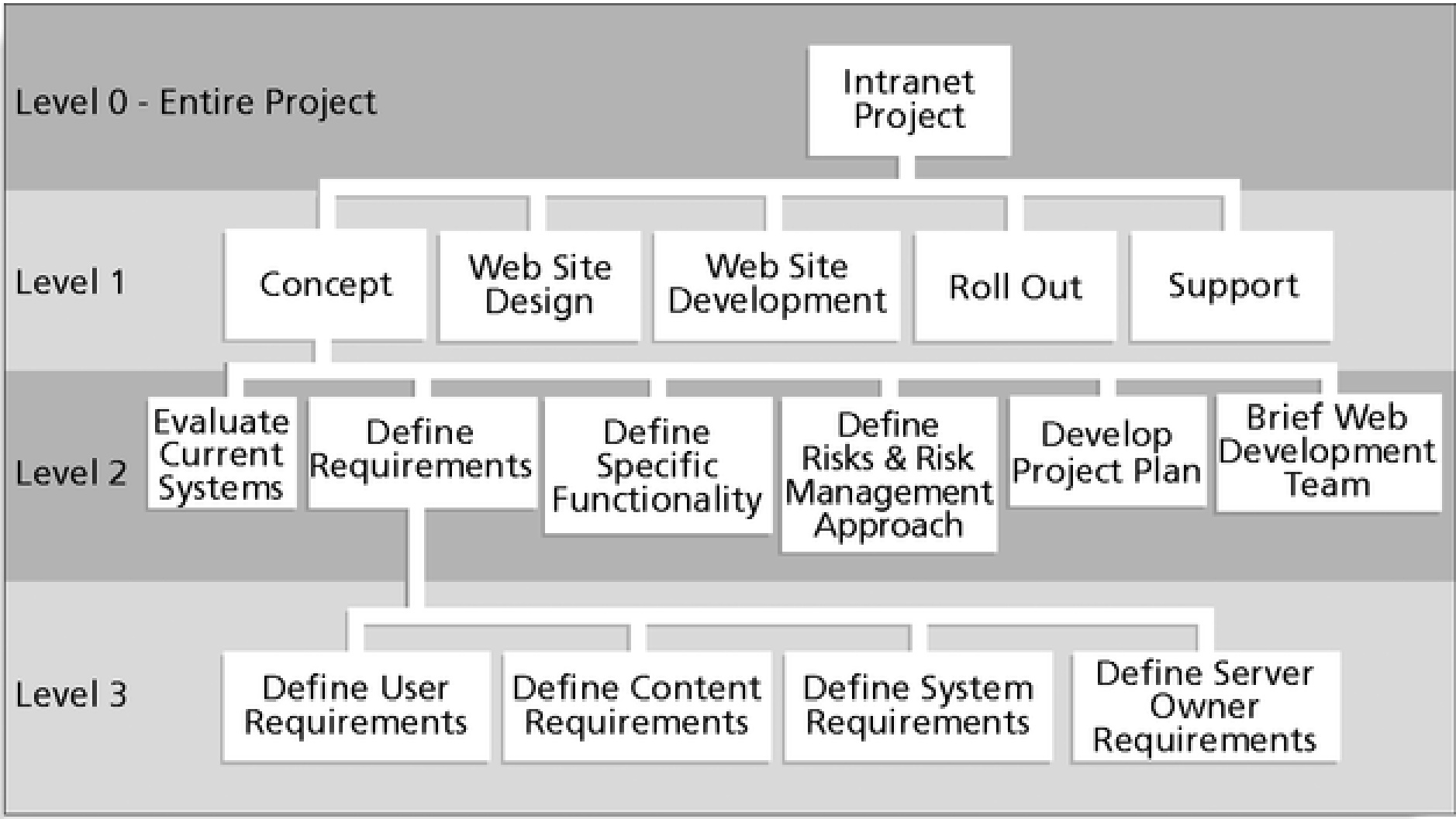
Work Breakdown Structure(WBS)

- A **WBS** is a deliverable-oriented grouping of the work involved in a project that defines the total scope of the project
- WBS is a foundation document that provides the basis for planning and managing project schedules, costs, resources, and changes
- **Decomposition** is subdividing project deliverables into smaller pieces
- A **work package** is a task at the lowest level of the WBS

Sample Intranet WBS Organized by Product



Sample Intranet WBS Organized by Phase



Sample Intranet WBS in Tabular Form

1.0 Concept
- 1.1 Evaluate current systems
- 1.2 Define Requirements
  - 1.2.1 Define user requirements
  - 1.2.2 Define content requirements
  - 1.2.3 Define system requirements
  - 1.2.4 Define server owner requirements
- 1.3 Define specific functionality
- 1.4 Define risks and risk management approach
- 1.5 Develop project plan
- 1.6 Brief Web development team

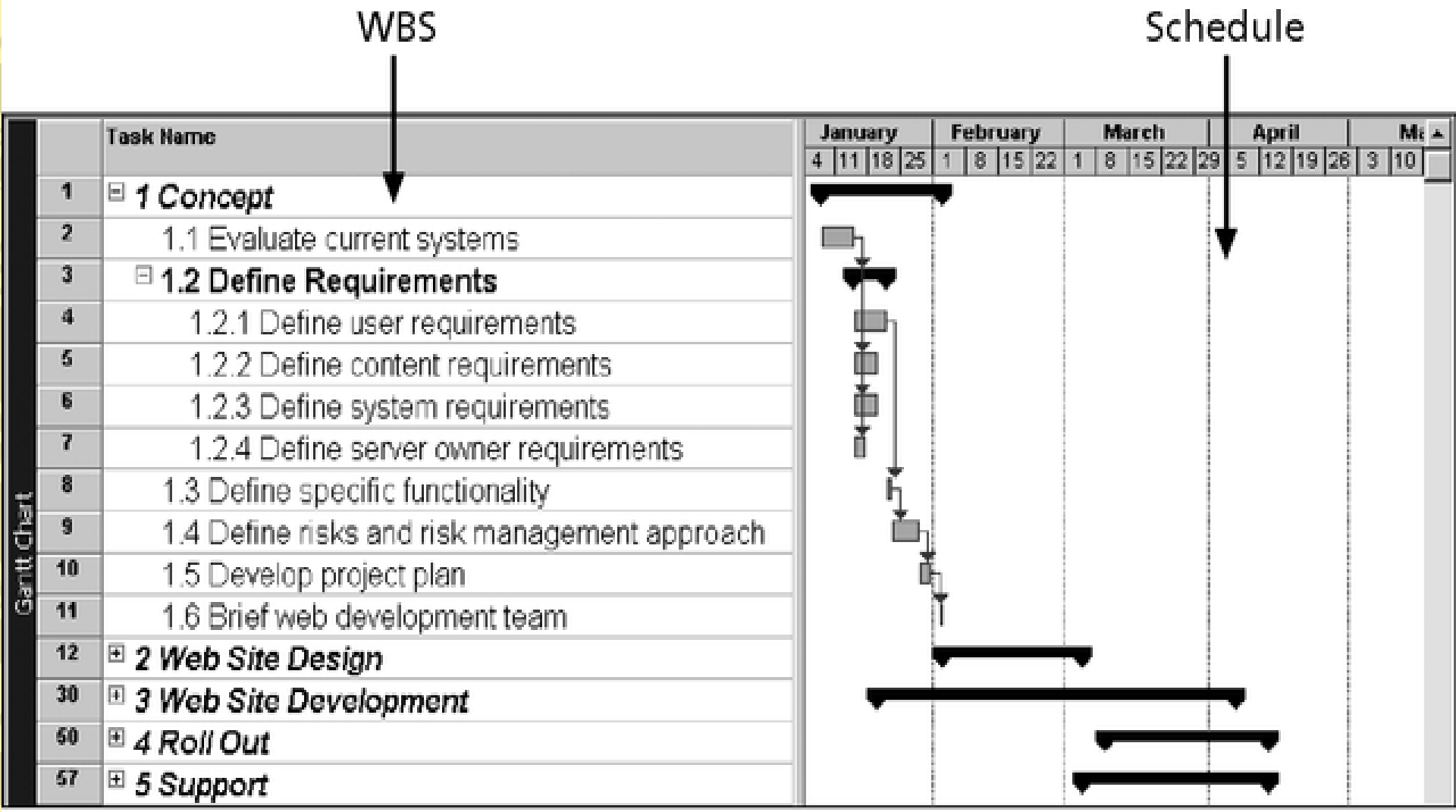
2.0 Web Site Design

3.0 Web Site Development

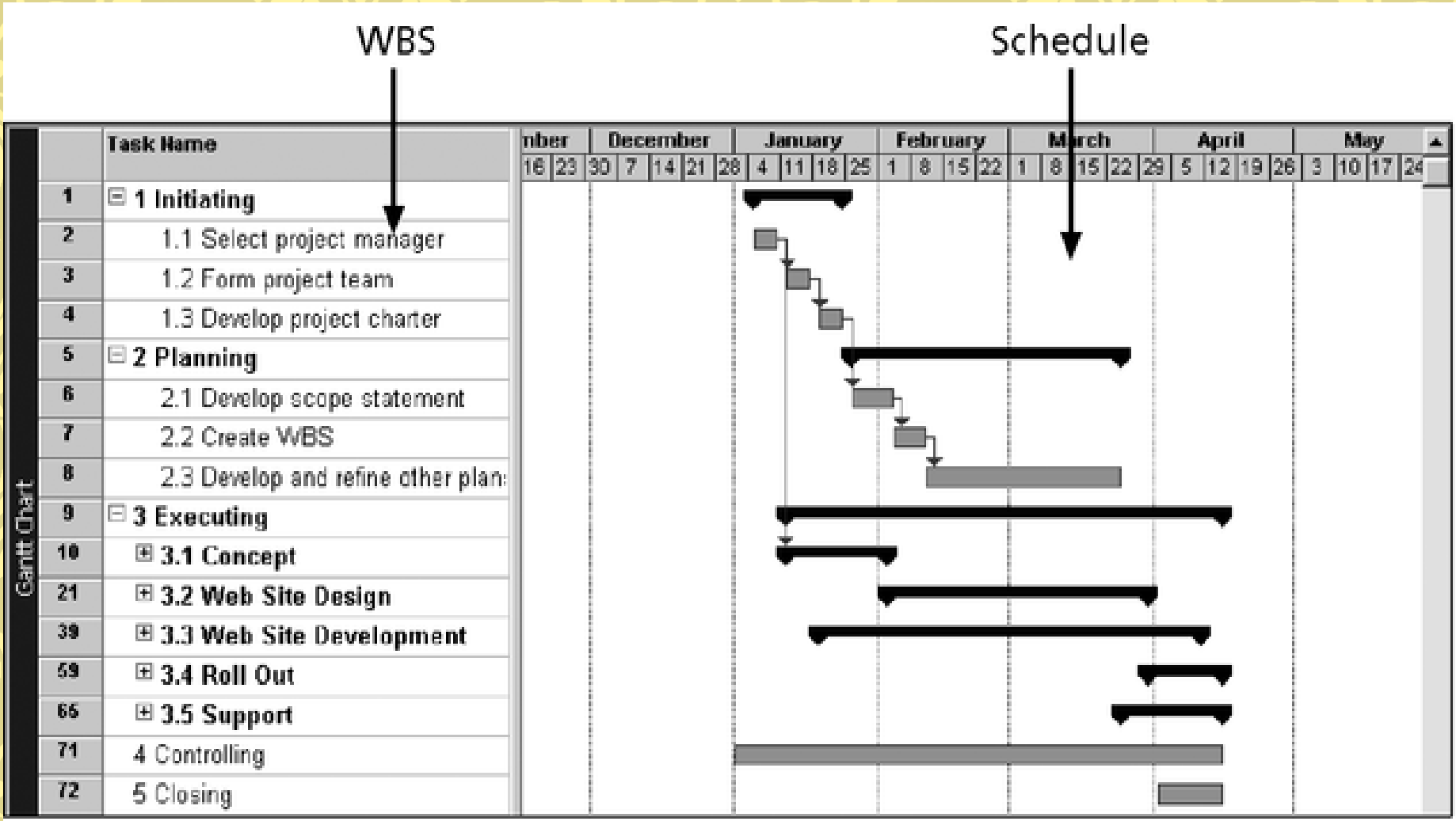
4.0 Roll Out

5.0 Support

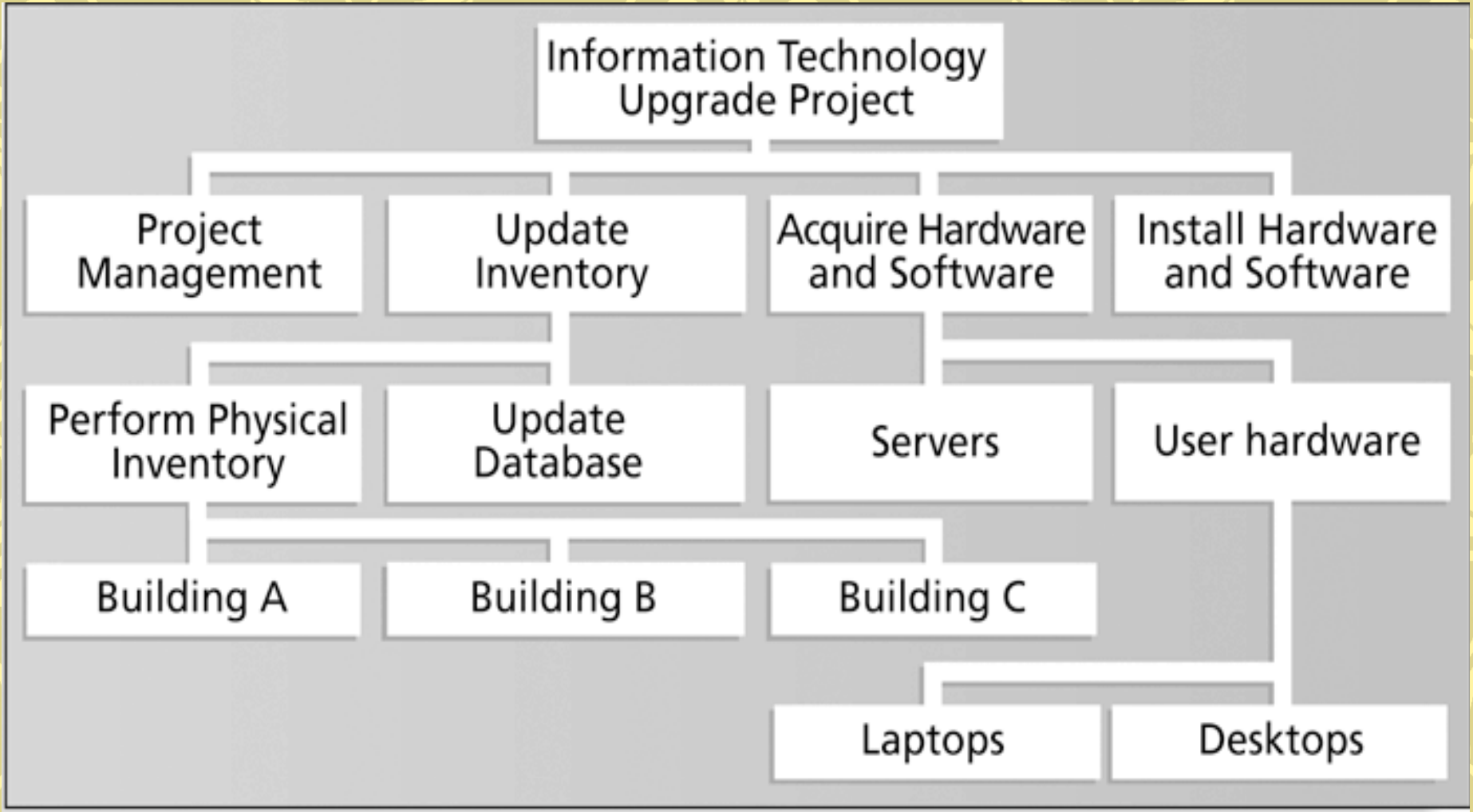
Sample Intranet WBS in Gantt Chart



Sample Intranet WBS in Gantt Chart organized by PM Process Group



Resulting WBS in Chart Form



Scope Verification

- It is very difficult to create a good scope statement and WBS for a project
- It is even more difficult to verify project scope and minimize scope changes
- **Scope verification** involves formal acceptance of the completed project scope by the stakeholders
- Acceptance is often achieved by a customer inspection and then sign-off on key deliverables

Best Practice for avoiding Scope Problems

1. Keep the scope realistic: Don't make projects so large that they can't be completed; break large projects down into a series of smaller ones
2. Involve users in project scope management: Assign key users to the project team and give them ownership of requirements definition and scope verification
3. Use off-the-shelf hardware and software whenever possible: Many IT people enjoy using the latest and greatest technology, but business needs, not technology trends, must take priority
4. Follow good project management processes: As described in this chapter and others, there are well-defined processes for managing project scope and others aspects of projects

Using Software to assist in Project Scope Management

- Word-processing software helps create several scope-related documents
- Spreadsheets help to perform financial calculations and weighed scoring models, and develop charts and graphs
- Communication software like e-mail and the Web help clarify and communicate scope information
- Project management software helps in creating a WBS, the basis for tasks on a Gantt chart
- Specialized software is available to assist in project scope management

Project Selection Methods

- Understand basic evaluation models for selecting projects
- Understand various techniques and approaches to evaluating potential projects
- Understand the utility of computer tools in project selection
- Be able to evaluate your organization's techniques and suggest improvements

Why is Project Selection important?

- The FIRST STEP in successful projects
- Wasted resources with starts and stops, high-risk, high-cost projects
- Lost opportunity costs of not doing the “right” projects
- Completion of projects that do not contribute to the organization’s strategic direction (throw-aways)

Strategic planning for project selection

- **Strategic planning** involves determining long-term objectives, predicting future trends, and projecting the need for new products and services.
- **Organizations often perform a SWOT analysis:**
- **Strengths, Weaknesses, Opportunities, and Threats**
- As part of strategic planning, organizations should:

A)Identify potential projects.

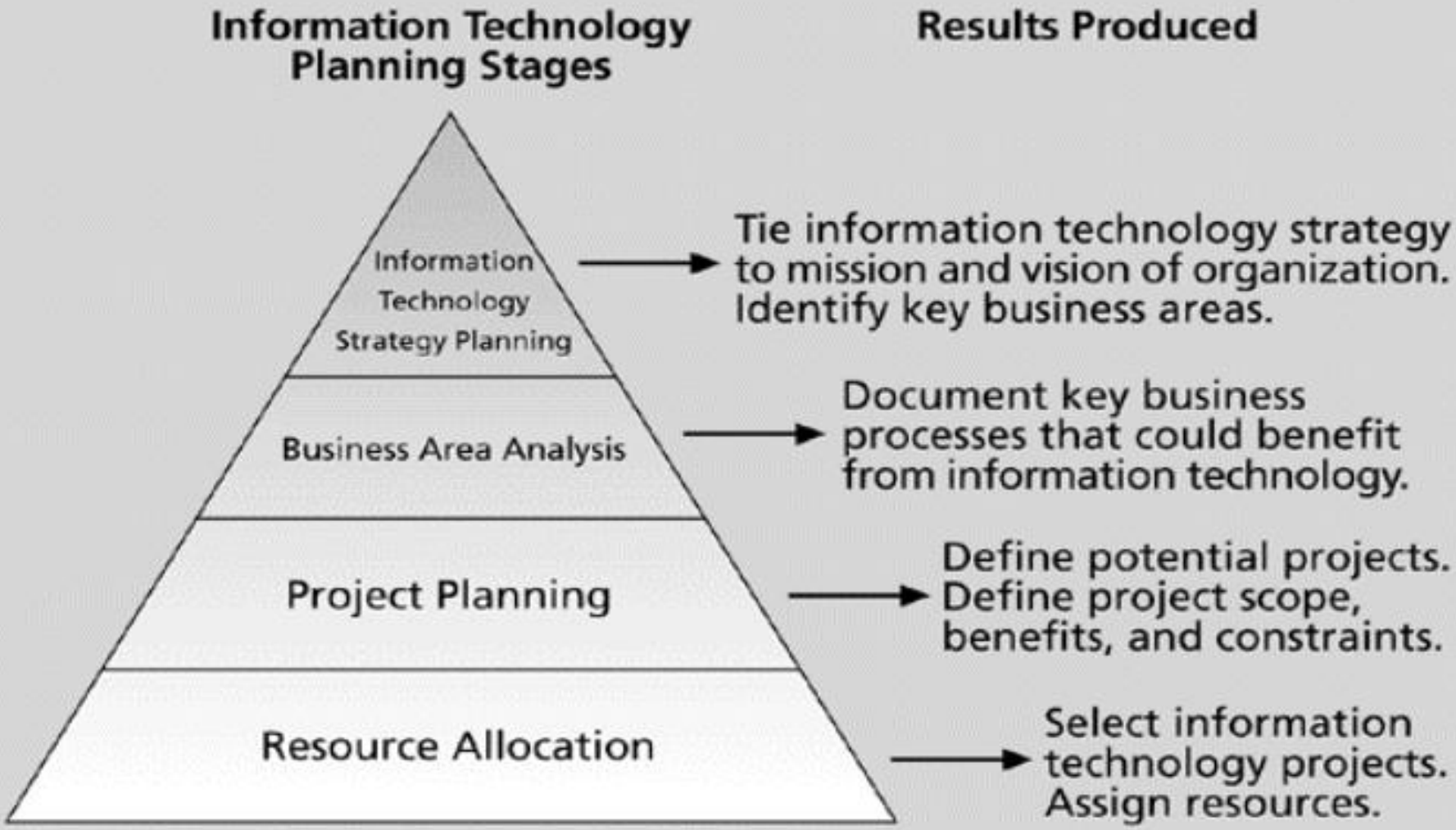
B) Use realistic methods to select which projects to work on.

C) Formalize project initiation by issuing a *project charter*.

Identifying potential projects

- It's crucial to align IT projects with business strategy.
- Supporting explicit business objectives is the number one reason cited for investing in IT projects.
- Companies with consolidated IT operations have a 24 percent lower operational cost per end user.
- The consistent use of IT standards lowers application development costs by 41 percent per user.

Information Technology Planning Process



Methods for selecting projects

There is usually not enough time or resources to implement all projects.

Methods for selecting projects include:

1. Focusing on broad organizational needs.
2. Categorizing information technology projects.
3. Performing net present value or other financial analyses.
4. Using a weighted scoring model.

1.Focusing on broad organizational needs

- “It is better to measure gold roughly than to count pennies precisely.”
- Three important success criteria for projects:
- There is a **need** for the project.
- There are **funds** available for the project.
- There is a strong **will** to make the project succeed.

2.Categorizing IT Projects

- One categorization assesses whether the project provides a response to:
- A problem
- An opportunity
- A directive
- Another categorization is based on the *time it will take* to complete a project or the date by which it must be done.
- Another categorization is the *overall priority* of the project.

3.Performing net present value or other financial analyses

- Financial considerations are often an important aspect of the project selection process.
- Three primary methods for determining the projected financial value of projects:

1. Net present value (NPV) analysis
2. Return on investment (ROI)
3. Payback analysis

Net Present Value Analysis

- **Net present value** (NPV) analysis is a method of calculating the expected net monetary gain or loss from a project by discounting all expected future cash inflows and outflows to the present point in time.

- Projects with a positive NPV should be considered if financial value is a key criterion.

- The higher the NPV, the better.

Net Present Value Analysis

- If we invest $100 at 20% interest, after one year it will be worth $120 and after two years compounded it will be worth $144
- Now NPV is the reverse of compound interest
- If you were offered $120 one year from now and the inflation and interest rate was 20%, working backwards its value in today terms would be $100
- This is called the present value
- And when the cash flow over a number of years is combined in this manner the total figure is called the net present value (NPV)

NPV Formula

- NPV Formula

$$NPV = \sum_{t=1}^{n} A * DF$$

  - DF=discount factor = $\frac{1}{(1+r)^t}$
  - t = the year of cash flows
  - r = discount rate
  - A = the amount of cash flows each year

Table of NPV Discount Factor

Year	Discount rate (%)					
	5	6	8	10	12	15
1	0.9524	0.9434	0.9259	0.9091	0.8929	0.8696
2	0.9070	0.8900	0.8573	0.8264	0.7972	0.7561
3	0.8638	0.8396	0.7938	0.7513	0.7118	0.6575
4	0.8227	0.7921	0.7350	0.6830	0.6355	0.5718
5	0.7835	0.7473	0.6806	0.6209	0.5674	0.4972
6	0.7462	0.7050	0.6302	0.5645	0.5066	0.4323
7	0.7107	0.6651	0.5835	0.5132	0.4523	0.3759
8	0.6768	0.6274	0.5403	0.4665	0.4039	0.3269
9	0.6446	0.5919	0.5002	0.4241	0.3606	0.2843
10	0.6139	0.5584	0.4632	0.3855	0.3220	0.2472
15	0.4810	0.4173	0.3152	0.2394	0.1827	0.1229
20	0.3769	0.3118	0.2145	0.1486	0.1037	0.0611
25	0.2953	0.2330	0.1460	0.0923	0.0588	0.0304

Net Present Value Example-1

Discount Rate 10%					
Year	1	2	3	4	5
Project 1					
Costs	$5,000	$1,000	$1,000	$1,000	$1,000
Benefits	$0	$2,000	$3,000	$4,000	$5,000
Project 2					
Costs	$2,000	$2,000	$2,000	$2,000	$2,000
Benefits	$1,000	$2,000	$4,000	$4,000	$4,000

- NPV_1= -5,000*0.9091 + 1,000*0.8264 + 2,000*0.7513
  + 3,000*0.6830 + 4,000*0.6209 = $2,316.35
- NPV_2 = -1,000*0.9091 + 0*0.8264 + 2,000*0.7513
  + 2,000*0.6830 + 2,000*0.6209 = $3,201.41

$NPV_2 > NPV_1 \Rightarrow$ We select Project 2 (We can also calculate in Excel)

Net Present Value Example-1

SUM | =NPV(B1,B6:F6)

	A	B	C	D	E	F	G
1	Discount Rate	10%					
2							
3	Project1	Year1	Year2	Year3	Year4	Year5	Total
4	Benefit	$0.00	$2,000.00	$3,000.00	$4,000.00	$5,000.00	$14,000.00
5	Cost	$5,000.00	$1,000.00	$1,000.00	$1,000.00	$1,000.00	$9,000.00
6	Cash flow	-$5,000.00	$1,000.00	$2,000.00	$3,000.00	$4,000.00	$5,000.00
7	NPV	=NPV(B1,B6:F6)					
8							
9							
10	Project1	Year1	Year2	Year3	Year4	Year5	Total
11	Benefit	$1,000.00	$2,000.00	$4,000.00	$4,000.00	$4,000.00	$15,000.00
12	Cost	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$10,000.00
13	Cash flow	-$1,000.00	$0.00	$2,000.00	$2,000.00	$2,000.00	$5,000.00
14	NPV	$3,201.41					

Net Present Value Example-2

Discount Rate 10%					
Year	0	1	2	3	4
Machine A					
Cash flow	($35,000)	$20,000	$15,000	$10,000	$10,000
Discount factor	1	0.9091	0.8264	0.7513	0.6830
Machine B					
Cash flow	($35,000)	$10,000	$10,000	$15,000	$20,000
Discount factor	1	0.9091	0.8264	0.7513	0.6830

- NPV_A= -35,000 * 1 + 20,000 * 0.9091 + 15,000 * 0.8264
  + 10,000 * 0.7513 + 10,000 * 0.6830 = $9,921
- NPV_B = -35,000 * 1 + 10,000 * 0.9091 + 10,000 * 0.8264
  + 15,000 * 0.7513 + 20,000 * 0.6830 = $7,284.5

$NPV_A > NPV_B \Rightarrow$ We select Machine A

Net Present Value Calculation

- Determine estimated costs and benefits for the life of the project and the products it produces
- Determine the discount rate (check with your organization on what to use)

Calculate the NPV

Notes: Some organizations consider the investment year as year 0, while others start in year 1. Some people enter costs as negative numbers, while others do not.

- Check with your organization for their preferences

Return on Investment (ROI)

- **Return on investment** (ROI) is a metric used to understand the profitability of an investment.
- ROI compares how much you paid for an investment to how much you earned to evaluate its efficiency.

ROI = (Net Profit / Cost of Investment) x 100

- **The higher the ROI, the better.**

Return on Investment (ROI) Example

You can purchase 1,000 bars of chocolate for $2 apiece. You plan to sell the chocolate to a grocery store for $3 per piece. In addition to the cost of purchasing the chocolate, you need to pay $100 in transportation costs.

Should you pursue this opportunity? Will you make a profit?

- *First tally your total expenses and your total expected revenues.*
  - *Expected Revenues = 1,000 x $3 = $3,000*
  - *Total Expenses = (1,000 x $2) + $100 = $2,100*
- *Subtract the expenses from your expected revenue to determine the net profit.*
  - *Net Profit = $3,000 - $2,100 = $900*
- *To calculate the expected return on investment, divide the net profit by the cost of the investment, and multiply that number by 100.*
  - *ROI = ($900 / $2,100) x 100 = 42.9%*

By running this calculation, you see the project will yield a positive return on investment,

Payback Analysis

- The **payback period** is the amount of time it takes to recover/recoup the cost of an investment
- Shorter paybacks mean more attractive investments, while longer payback periods are less desirable.

Example

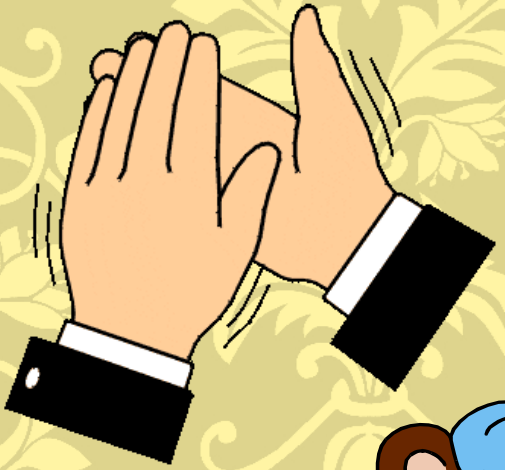
- To calculate the *payback period*, simply work out how long it will take to recover the initial outlay

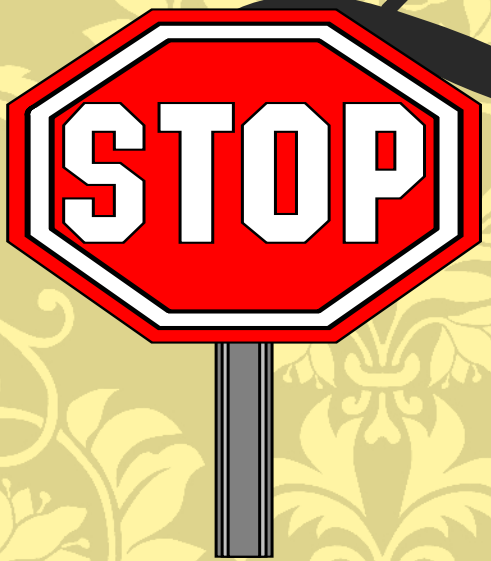
Year	Cash Flow Machine A	Cash Flow Machine B
0	($35,000)	($35,000)
1	$20,000	$10,000
2	$15,000	$10,000
3	$10,000	$15,000
4	$10,000	$20,000
Payback period	2 years	3 years

- Table 3.2: Payback period (Machine A 2 years, Machine B 3 years)
- Machine A will recover its outlay one year sooner than machine B
- Machine A is selected in preference to machine B

Summary

- Project scope management includes the processes required to ensure that the project addresses all the work required, and only the work required, to complete the project successfully
- Main processes include:
- Scope planning
- Scope definition
- Creating the WBS
- Scope verification
- Scope control





End of Chapter3

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