

MODULE

3

Process—
Design



MODULE
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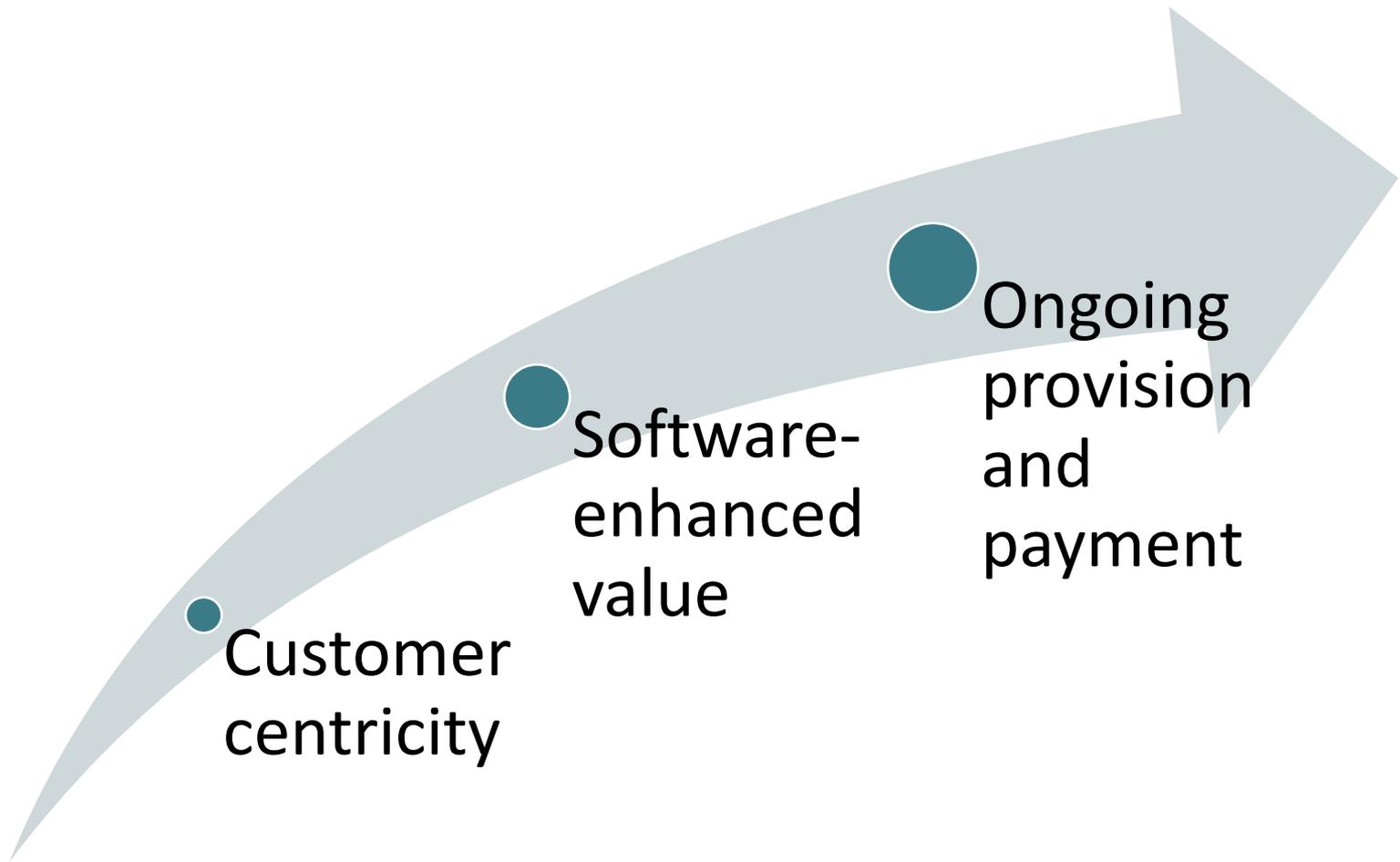
Process—
Design

CHAPTER

1

Governance
Structure

Trends Driving Change to Product Management



Product Management Strategies

Stable Teams

- Lead to better market awareness
- Help cultivate customer insights and empathy
- Lead to improved quality and maintainability

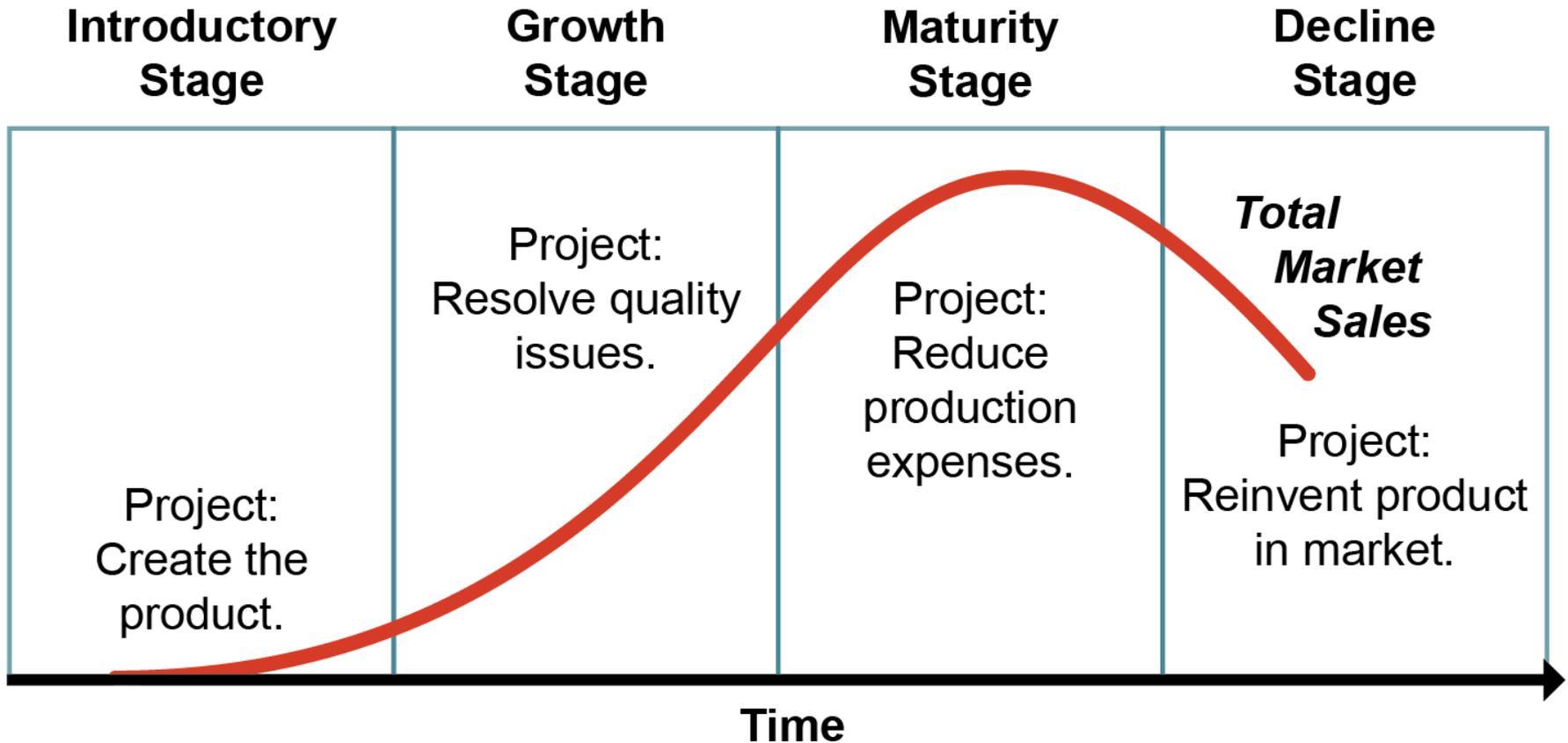
Incremental Funding

- Allows for better reactions to progress and direction of product
- Enables organizations to take risks on new products and markets

Program Management Structures

- Help adjust to market changing
- Allow for focus on providing and increasing customer benefits

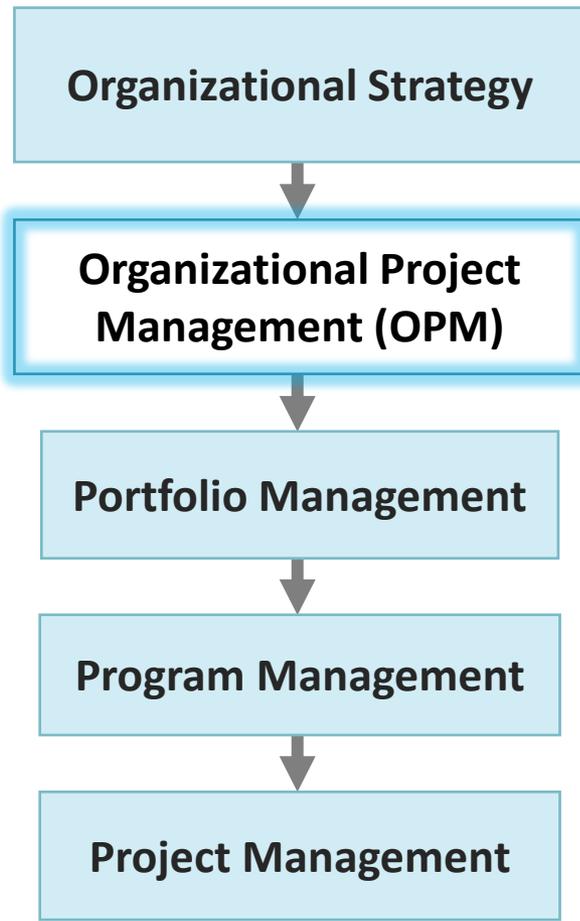
Product Life Cycle



Total Cost of Ownership

- Total cost of ownership includes all costs of a product over life, from the project costs and creating production capability to carbon footprint and end-of-life disposal.
- Product life cycle costs are not the responsibility of a project.
- Cutting corners on a project could lead to project failure or reduced profitability.

Organizational Project Management



- Strategy execution framework
- Hierarchical organization and management of initiatives by:
 - Portfolios and subportfolios
 - Projects not necessarily related
 - Programs and subprograms
 - Projects always related
 - Projects

Portfolio and Program Management

Portfolio Management

- Subportfolios, programs, or projects are not always related; may be organized around shared client, seller, technology, or resource.
- Components that provide the most value will be prioritized.
- Communication is essential.

Program Management

- Program success determined by ability to satisfy needs.
- Focuses on interdependencies within a project to determine optimal management approaches.

Project Management Office (PMO)

PMO role will vary by organization.



Supportive

- Low control
- Repository for:
 - Templates
 - Good practices
 - Training
 - Lessons learned



Controlling

- Medium control
- Require compliance: frameworks, methods, templates, etc.
- Governance

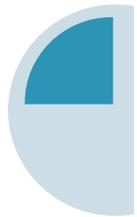


Directive

- High control
- Direct management of projects

Project Management Office (PMO)

PMO role for agile projects:



Supportive

- Measure agile effectiveness vs. predictive.
- Invitation-oriented “seller”:
- Agile teams can “buy.”
- Become indispensable.



Controlling and directive

- Desire for consistency at odds with agile mindset:
 - Allow reflecting, refinement, tailoring within limits.
 - Mandate external compliance.
 - Mandate product owner daily involvement.
- Or be supportive for agile.

Organization Governance Structure Major Functions

Maintaining alignment

- Governance at various levels needs to be consistent and aligned with organization's strategy and values.

Balancing risk

- Decide upon risk tolerance and act to ensure that proper balance of risk and reward is maintained.

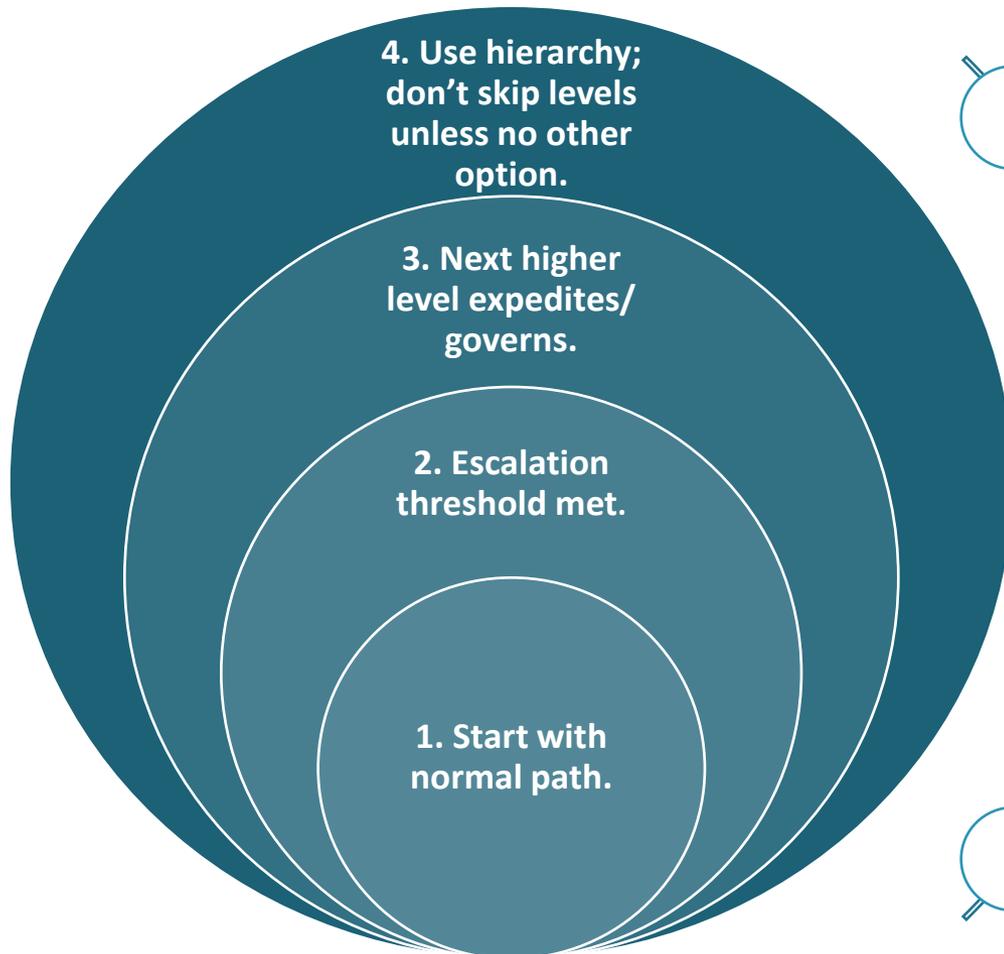
Ensuring performance

- Ensure that business value is being created through use of correct KPIs and appropriate targets.

Communicating about proper governance

- Requires frequent and effective communication of values and decisions.

Escalation Paths and Thresholds



Reasons to Escalate





Discussion Question

How does organizational structure influence or constrain a project?

- A. It fosters inefficiency that detracts from the project's value.
- B. It defines the project manager's authority.
- C. A strong structure can reduce reporting requirements.
- D. An effective structure can compensate for the effects of a weak organizational culture.

Organizational Structures

	Project Manager's Authority	Resource Availability	Who Manages Project's Budget
Organic/simple	Little or none	Little or none	Owner or operator
Functional (centralized)	Little or none	Little or none	Functional manager
Multi-divisional (may replicate functions per division with little centralization)	Little or none	Little or none	Functional manager
Matrix—strong	Moderate to high	Moderate to high	Project manager
Matrix—weak	Low	Low	Functional manager
Matrix—balanced	Low to moderate	Low to moderate	Mixed

Organizational Structures (continued)

	Project Manager's Authority	Resource Availability	Who Manages Project's Budget
Project-oriented	High to almost total	High to almost total	Project manager
Virtual	Low to moderate	Low to moderate	Mixed
Hybrid	Mixed	Mixed	Mixed
PMO	High to almost total	High to almost total	Project manager

Source: Project Management Institute, A Guide to the Project Management Body of Knowledge (PMBOK® Guide)—*Sixth Edition*, Project Management Institute, Inc., 2017, Table 2-1, Page 47. Material from this publication has been reproduced with the permission of PMI.



Discussion Question

A project manager meets with a team member's functional manager to gather input before the project manager addresses the individual's inadequate performance. What type of structure does this organization use?

- A. Functional
- B. Weak matrix
- C. Strong matrix
- D. Projectized

Project Governance

- Align project objectives with strategy.
- Oversight function.
- Tailor to values, norms, rules, culture, structure.

Establish/assess governance framework.

Communicate governance up and down.

Structure change management.

Validate resource quantity/quality.

Integrate, monitor, and control.

Monitor/influence external parties.

Manage risks and escalations.

Follow phase gates, closure.

PMI® Code of Ethics and Professional Conduct

- Applies to all PMI members, holders of PMI certifications, and PMI volunteers
- Mandatory and aspirational

Central values

- **Responsibility**
 - Learn and uphold policies, rules, regulations, and laws.
- **Respect**
 - Negotiate in good faith, seek understanding.
- **Fairness**
 - Avoid favoritism and discrimination.
- **Honesty**
 - Avoid dishonest behavior for personal gain.

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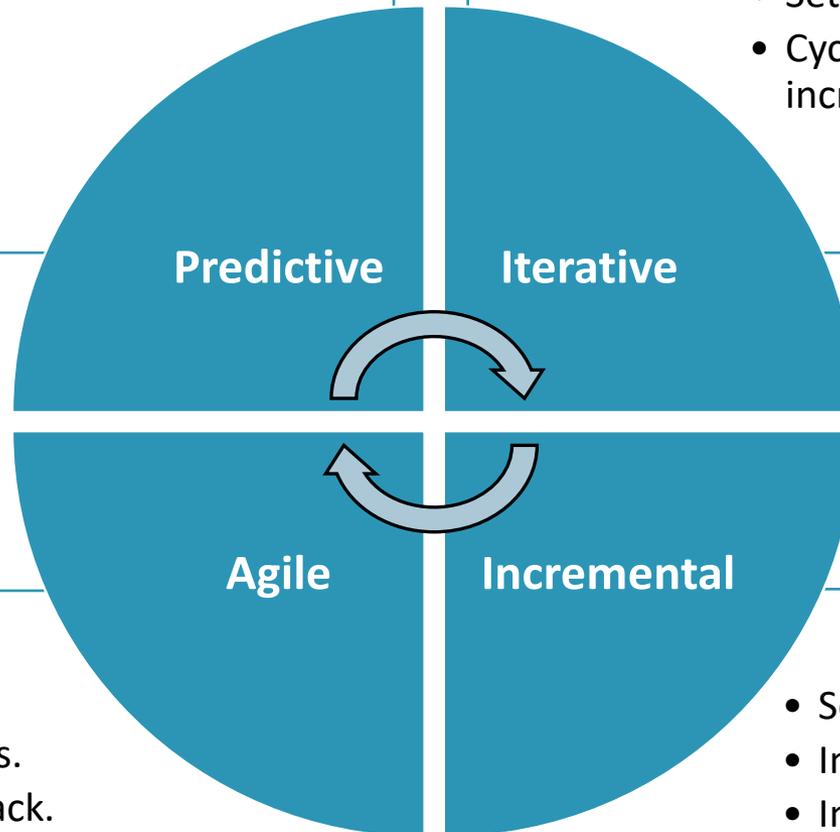
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Incremental
Value

Assessing Opportunities for Incremental Value

- Phases can result in increments.

- Set scope early.
- Cycles add functionality in increments.



- Viable and valuable incremental deliverables.
- Scope shaped by feedback.

- Set time early.
- Increments over time frame.
- Incomplete until final deliverable.

Benefits of Increments to Customers

Increments requested

- Fulfills customer need
- Still must be feasible

Client reassurance

- Demonstrations
- Working deliverables
- Avoids pouring money into “black box” unsure of what will come out

Feedback opportunity

- Explore uncertainty at low cost
- Technical feasibility
- Degree of customer acceptance
- Deviation from initial vision
- Resource capability and capacity
- Reflecting: process improvement



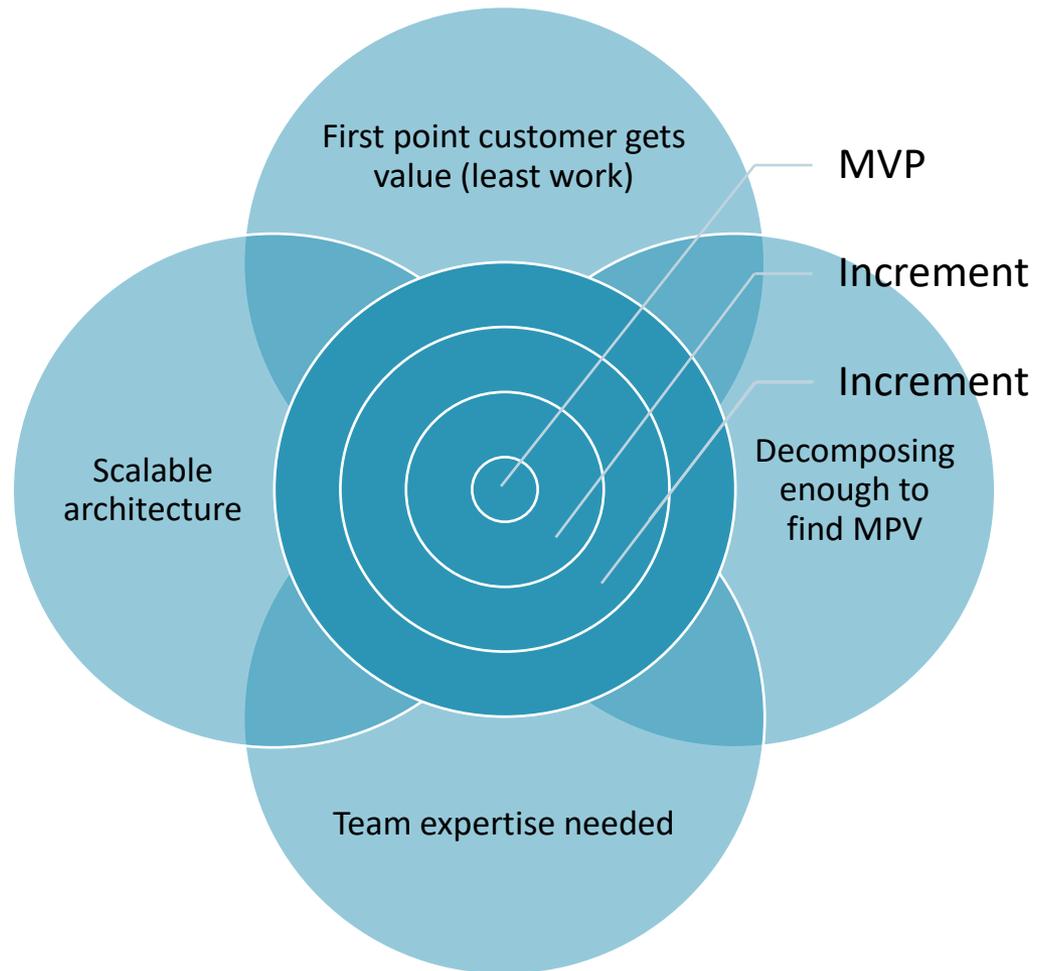
Discussion Question

What's the worst that can happen if a deliverable with small flaws is used in an agile demonstration?

- A. Product harms client organization's reputation
- B. Opportunity to better set expectations
- C. Not enough of the right feedback
- D. Project changes or cancellation

Increment Feasibility

- Predictive: phase dependencies
- Iterative
 - Prototype possible
 - Data collectible
- Incremental, agile
 - Minimum viable product (MVP)
 - Valuable MVP and increments



Agile and Incremental Urgency for Value

Project team's organization

- Progress billings
- Similar-size stories billed at fixed price: client control (pick stories, know cost)
- Capitalization of projects

Urgency value to customers

- Faster time to market
- New increments used in marketing
- May reduce total project time: deadlines
- Learn to respond to change faster

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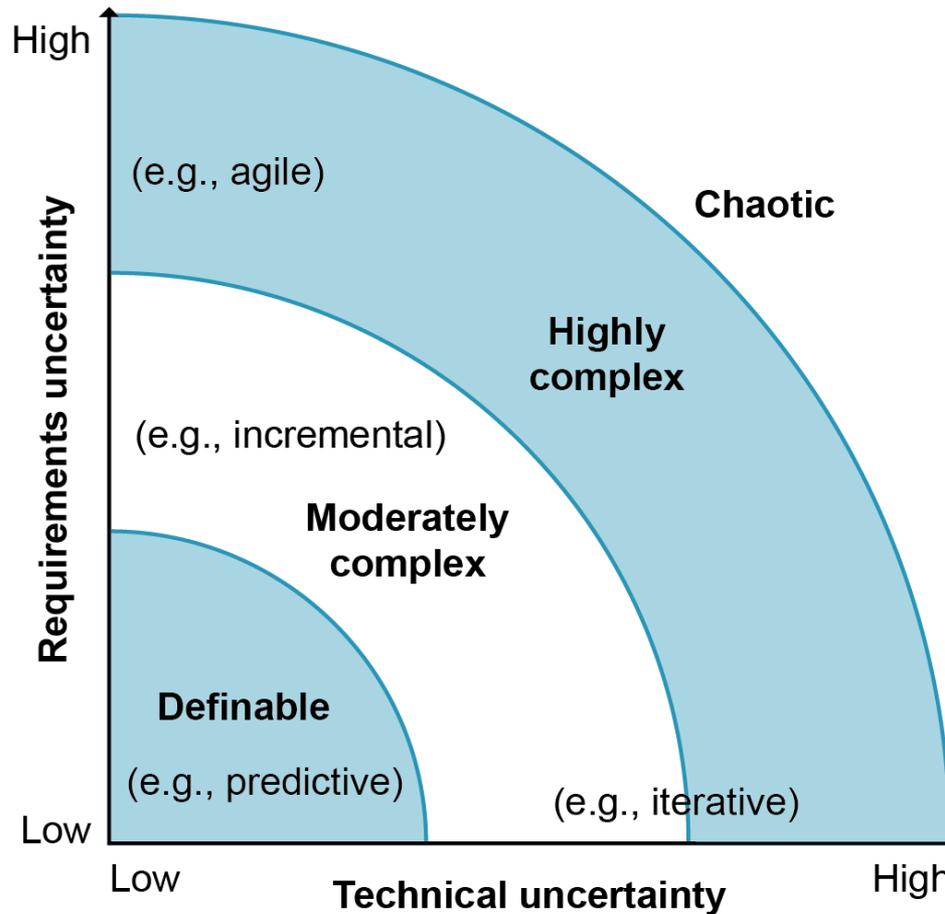
3

Development Approach and Life Cycle Performance Domain

Determining Variables for Products, Projects, and Organizations



Requirements versus Technical Uncertainty



Source: Adapted from the *Agile Practice Guide*.

Project Complexity and Magnitude

- Even straightforward projects may be complex.
 - Part may be due to project magnitude.
 - May necessitate use of predictive project management development approaches, though portions of the project may use other approaches.
- Simple projects but may still use non-predictive methods.

Cynefin Framework

Obvious
relationships

Complicated
relationships

Complex
relationships

Chaotic
relationships

Disordered
relationships

The PMBOK® Guide—Sixth Edition Framework*

You'll need to understand:

- 49 processes
- 5 Process Groups
- 10 Knowledge Areas
- Inputs, tools and techniques, and outputs for each process

* Note: Although the *Examination Content Outline* is no longer organized according to this framework, many questions on predictive projects will require detailed knowledge of this framework.

KNOWLEDGE AREAS	PROCESS GROUPS				
	Initiating	Planning	Executing	Monitoring and Controlling	Closing
Project Integration Management	• Develop Project Charter	• Develop Project Management Plan	• Direct and Manage Project Work • Manage Project Knowledge	• Monitor and Control Project Work • Perform Integrated Change Control	• Close Project or Phase
Project Scope Management		• Plan Scope Management • Collect Requirements • Define Scope • Create WBS		• Validate Scope • Control Scope	
Project Schedule Management		• Plan Schedule Management • Define Activities • Sequence Activities • Estimate Activity Durations • Develop Schedule		• Control Schedule	
Project Cost Management		• Plan Cost Management • Estimate Costs • Determine Budget		• Control Costs	
Project Quality Management		• Plan Quality Management	• Manage Quality	• Control Quality	
Project Resource Management		• Plan Resource Management • Estimate Activity Resources	• Acquire Resources • Develop Team • Manage Team	• Control Resources	
Project Communications Management		• Plan Communications Management	• Manage Communications	• Monitor Communications	
Project Risk Management		• Plan Risk Management • Identify Risks • Perform Qualitative Analysis • Perform Quantitative Analysis • Plan Risk Responses	• Implement Risk Responses	• Monitor Risks	
Project Procurement Management		• Plan Procurement Management	• Conduct Procurements	• Control Procurements	
Project Stakeholder Management	• Identify Stakeholders	• Plan Stakeholder Engagement	• Manage Stakeholder Engagement	• Monitor Stakeholder Engagement	

Source: Adapted from Project Management Institute, *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)—Sixth Edition*, Project Management Institute, Inc., 2017, Table 1-4, Page 25. Material from this publication has been reproduced with the permission of PMI.

What Is a “Process”?

- A set of interrelated actions and activities performed to achieve a specified result
- Ensures the effective flow of a project throughout its life cycle
- Characterized by:
 - Inputs
 - Tools and techniques
 - Outputs



PMP® Process Groups

KNOWLEDGE AREAS	PROCESS GROUPS				
	Initiating	Planning	Executing	Monitoring and Controlling	Closing
Project Integration Management	<ul style="list-style-type: none"> Develop Project Charter 	<ul style="list-style-type: none"> Develop Project Management Plan 	<ul style="list-style-type: none"> Direct and Manage Project Work Manage Project Work 	<ul style="list-style-type: none"> Monitor and Control Project Work Perform Integrated Change Control 	<ul style="list-style-type: none"> Close Project or Phase

KNOWLEDGE AREA	PROCESS GROUPS				
	Initiating	Planning	Executing	Monitoring and Controlling	Closing
Project Integration Management				<ul style="list-style-type: none"> Manage Project Knowledge 	<ul style="list-style-type: none"> Perform Integrated Change Control
Project Scope Management		<ul style="list-style-type: none"> Plan Scope Management Collect Requirements Define Scope Create WBS 			<ul style="list-style-type: none"> Validate Scope Control Scope
Project Schedule Management		<ul style="list-style-type: none"> Plan Schedule Management Define Activities Sequence Activities Estimate Activity Durations Develop Schedule 			<ul style="list-style-type: none"> Control Schedule
Project Cost Management		<ul style="list-style-type: none"> Plan Cost Management Estimate Costs Determine Budget 			<ul style="list-style-type: none"> Control Costs
Project Quality Management		<ul style="list-style-type: none"> Plan Quality Management 	<ul style="list-style-type: none"> Manage Quality 		<ul style="list-style-type: none"> Control Quality
Project Resource Management		<ul style="list-style-type: none"> Plan Resource Management Estimate Activity Resources 	<ul style="list-style-type: none"> Acquire Resources Develop Team Manage Team 		<ul style="list-style-type: none"> Control Resources
Project Communications Management		<ul style="list-style-type: none"> Plan Communications Management 	<ul style="list-style-type: none"> Manage Communications 		<ul style="list-style-type: none"> Monitor Communications
Project Risk Management		<ul style="list-style-type: none"> Plan Risk Management Identify Risks Perform Qualitative Analysis Perform Quantitative Analysis Plan Risk Responses 	<ul style="list-style-type: none"> Implement Risk Responses 		<ul style="list-style-type: none"> Monitor Risks
Project Procurement Management		<ul style="list-style-type: none"> Plan Procurement Management 	<ul style="list-style-type: none"> Conduct Procurements 		<ul style="list-style-type: none"> Control Procurements
Project Stakeholder Management	<ul style="list-style-type: none"> Identify Stakeholders 	<ul style="list-style-type: none"> Plan Stakeholder Engagement 	<ul style="list-style-type: none"> Manage Stakeholder Engagement 		<ul style="list-style-type: none"> Monitor Stakeholder Engagement

PMP® Processes

The *PMBOK® Guide—Sixth Edition* identifies **49 processes**:

2

related to getting the project set up (*Initiating*)

24

related to thinking through the project (*Planning*)

10

related to doing the actual work (*Executing*)

12

related to keeping the project in check (*Monitoring and Controlling*)

1

related to concluding the project (*Closing*)

How Do the Processes Fit Together?

Process Groups

The time frame in which processes are performed over a project's life cycle or phase

*Your **actions** in a project*

Knowledge Areas

The classification of processes into distinct competency areas used on most projects most of the time

*The things you need to **understand***

10 Knowledge Areas

- 1) **Integration:** Begin with the end in mind and then authorize the project. Coordinate activities, control changes, and close the project.
- 2) **Scope:** State what you will be doing and will not be doing and validate that what was in scope got done.
- 3) **Schedule:** Specify what activities to do, in what order, and with what resources. Create a realistic schedule and control against the baseline.
- 4) **Cost:** Estimate what activities and materials will cost, set the budget, and measure and correct variances.
- 5) **Quality:** Set quality metrics, define and audit processes, and control deliverable quality.

KNOWLEDGE AREAS	PROCESS GROUPS				
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10 Knowledge Areas

- 6) **Resource:** Plan the team/material; acquire, develop, and manage the team/material; and release the team/material.
- 7) **Communications:** Plan how and who gets what messages and ensure that this communication occurs.
- 8) **Risk:** Identify and prioritize risks, determine schedule and monetary impact, plan responses, and monitor risks and responses.
- 9) **Procurement:** Identify what to procure using what types of contracts, issue requests for proposals or bids, control and close procurements.
- 10) **Stakeholder:** Identify persons who can influence or will be influenced by the project, assess their impact, and manage their expectations and engagement.

KNOWLEDGE AREAS	Initiating	PROCESS GROUPS			Monitoring and Controlling	Closing
		Planning	Executing			
Project Integration Management	• Develop Charter	• Develop Project Management Plan	• Direct and Manage Project Work	• Monitor and Control Project Work	• Close Project or Phase	
Project Scope Management		• Plan Scope Management • Collect Requirements • Define Scope • Create WBS		• Validate Scope • Control Scope		
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PMP® Framework Process Map

	Initiating	Planning	Executing	Monitoring/ Controlling	Closing
Integration Management	1	3	27, 28	37, 38	49
Scope Management		4, 5, 6, 7		39, 40	
Schedule Management		8, 9, 10, 11, 12		41	
Cost Management		13, 14, 15		42	
Quality Management		16	29	43	
Resource Management		17, 18	30, 31, 32	44	
Communications Management		19	33	45	
Risk Management		20, 21, 22, 23, 24	34	46	
Procurement Management		25	35	47	
Stakeholder Management	2	26	36	48	

Understand the Process Map

It is important to understand the process map:

- Where are you in the project?
- You will be asked for the sequence of processes—What happens next?
- What activities recur in the project?

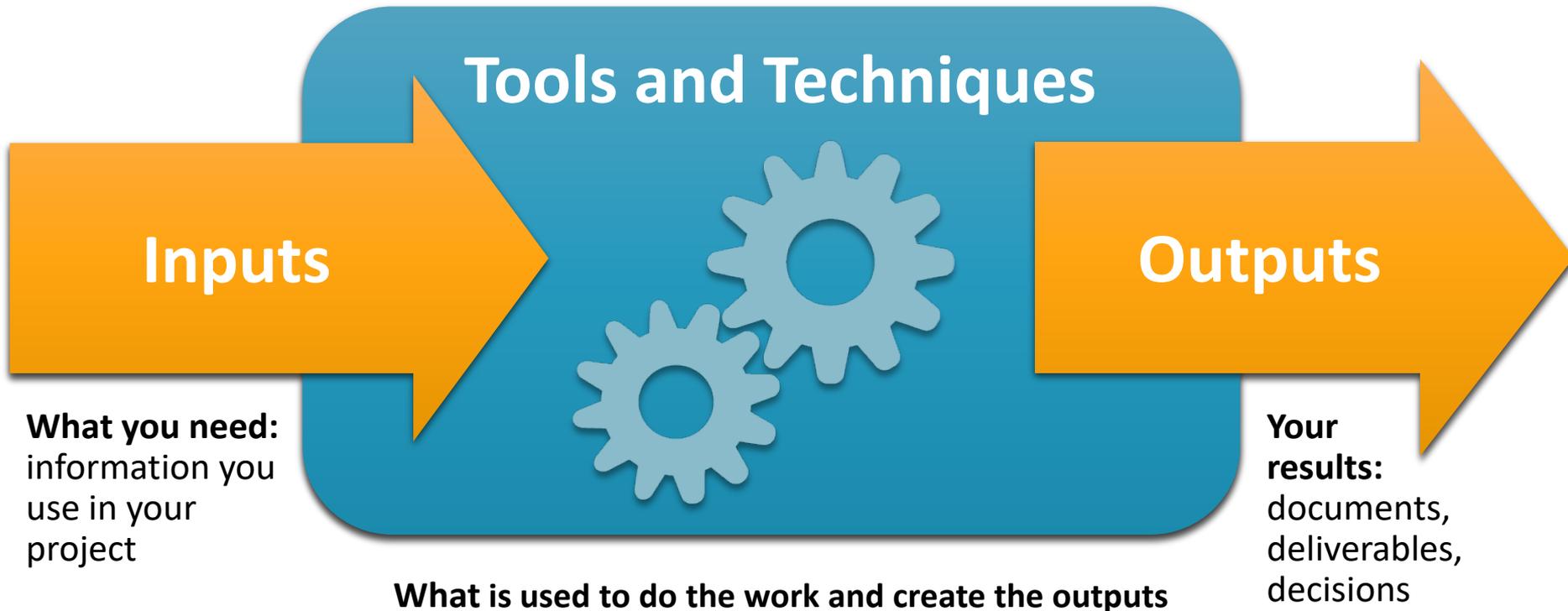
Use some time at the beginning of your exam to write out the process map and key formulas.

Key Points for Process Map

- Integration is the only Knowledge Area that has a process in each Process Group.
- Both the Planning and Monitoring and Controlling Process Groups have processes in each Knowledge Area.
- Initiating has only two processes.
- Closing has only one process.
- Scope, Schedule, and Cost have processes only in Planning and Monitoring and Controlling; all others have something in Executing.

**Become familiar
with the
process map!**

Process “ITTO” Model



All of the processes in the PMBOK® Guide—Sixth Edition use this model.

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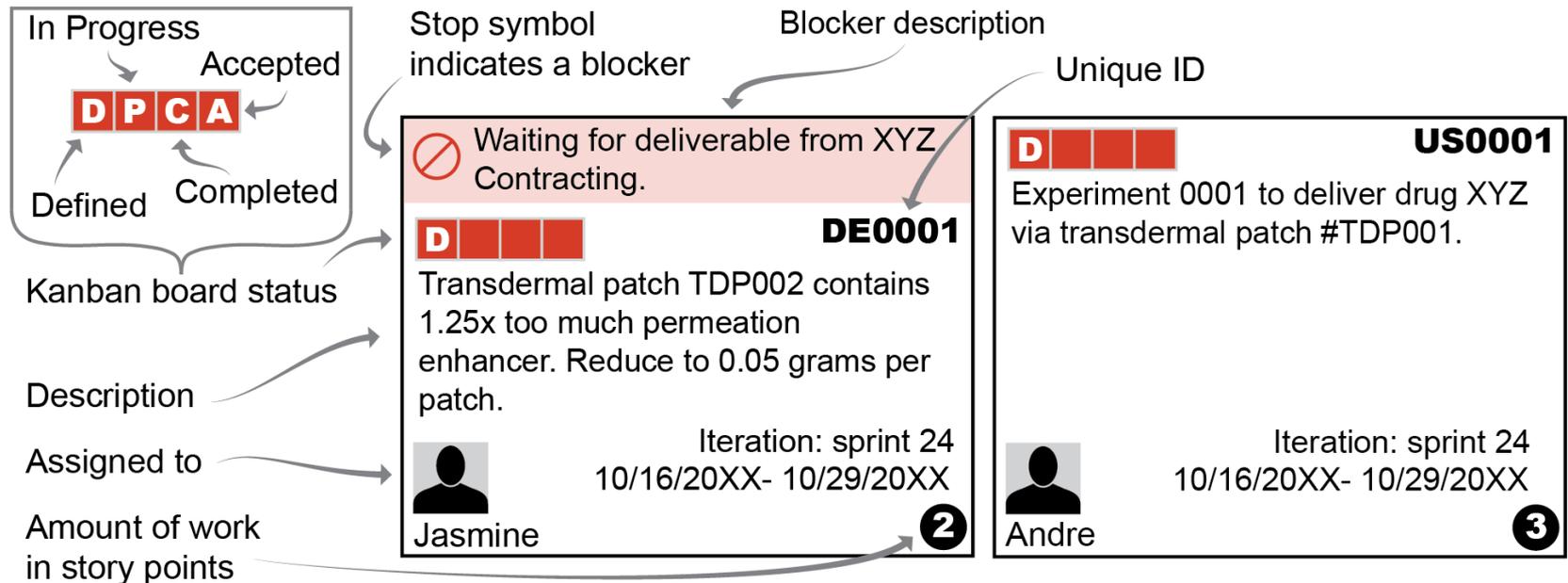
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Agile Project
Development
Approach

Kanban Method

- “Pull system.”
- Flow-based: Finish feature, start next (not set to iteration).
- Avoid long queues of WIP.
- WIP limit: “Feel pain,” forced to fix root causes.
- No value to unfinished work.
- Determine ceremony timing.

Kanban Cards



Kanban Board

Project Backlog

Iteration Backlog

WIP

“Done”

To do	Plan	Develop	Test	Deploy	Done
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<p>US0024 D [] [] [] [] El illum dolore eu feugiat nulla facilisis at vero eros et accumsan et iusto odio dignissim qui.</p> <p>Iteration: sprint XX XX/XX/20XX- XX/XX/20XX</p> <p>Paul 2</p>	<p>US0022 D [] [] [] [] Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed diam nonummy nibh euismod.</p> <p>Iteration: sprint XX XX/XX/20XX- XX/XX/20XX</p> <p>Megan 3</p>	<p>US0014 P [] [] [] [] Eros et accumsan et iusto odio dignissim qui blandit praesent luptatum zzril delenit augue duis dolore te feugiat nulla facilisi.</p> <p>Iteration: sprint XX XX/XX/20XX- XX/XX/20XX</p> <p>Sydney 1</p>	<p>US0037 P [] [] [] [] Cons ectetur adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat.</p> <p>Iteration: sprint XX XX/XX/20XX- XX/XX/20XX</p> <p>Andre 2</p>	<p>US0006 C [] [] [] [] Isto odio dignissim qui blandit praesent luptatum zzril delenit.</p> <p>Iteration: sprint XX XX/XX/20XX- XX/XX/20XX</p> <p>Megan 2</p>	
<p>US0036 D [] [] [] [] Lorem ipsum dolor sit amet, cons ectetur adipiscing elit, sed diam.</p> <p>Iteration: sprint XX XX/XX/20XX- XX/XX/20XX</p> <p>Megan 1</p>		<p>US0019 P [] [] [] [] Lorem ipsum dolor sit amet, consectetur adipiscing elit.</p> <p>Iteration: sprint XX XX/XX/20XX- XX/XX/20XX</p> <p>Andre 3</p>	<p>US0043 P [] [] [] [] Sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat.</p> <p>Iteration: sprint XX XX/XX/20XX- XX/XX/20XX</p> <p>Julian 3</p>		
<p>US0004 D [] [] [] [] Exerci tation ullamcorper suscipit lobortis nisl ut aliquip ex ea commodo consequat.</p> <p>Iteration: sprint XX XX/XX/20XX- XX/XX/20XX</p> <p>Julian 3</p>		<p>US0025 P [] [] [] [] Euismod tincidunt ut laoreet dolore magna aliquam erat volutpat.</p> <p>Iteration: sprint XX XX/XX/20XX- XX/XX/20XX</p> <p>Megan 1</p>			

Scrum

Rugby scrum:
whole team
moves as unit,
passing ball.

Iteration-
based:
timeboxed
iterations,
ceremonies.

Product owner
involved daily,
generalizing
specialist team
collaboration,
Scrum master
is servant
leader.

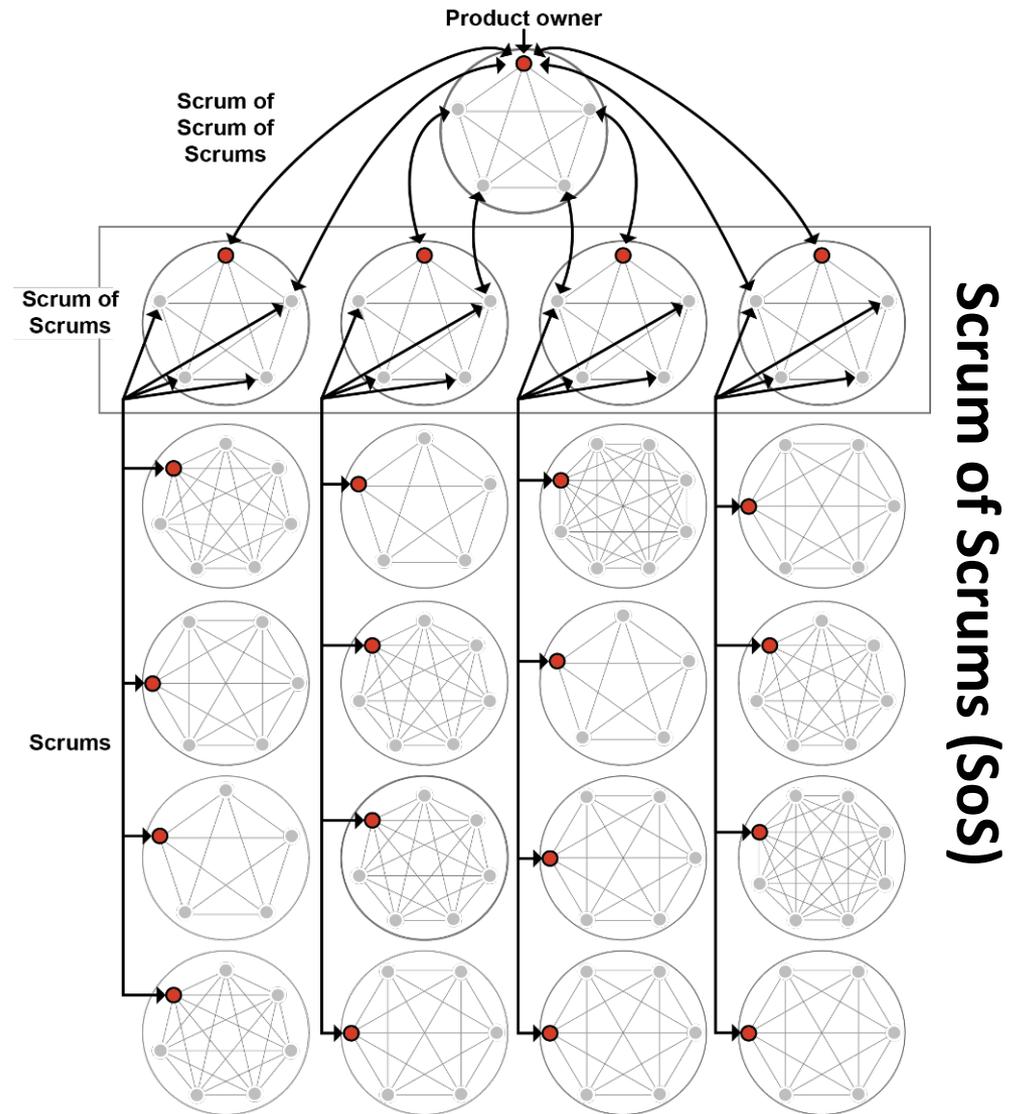
Scrumboard
(kanban
board) may
not have WIP
limits.

Accepted
deliverables in
holding area,
bundled for
release.

Evolutions of Scrum

Scrumban

- Scrum + Kanban.
- Move to rigorous kanban rules.
- WIP limits, flow-based.
- Planning triggers. (WIP has capacity.)
- Uses existing team role names.



Evolutions of Scrum

Large-Scale Scrum (LeSS)

- Light framework like SoS, mimics Scrum principles.
- Transparency, systems thinking, whole product.
- One product owner, backlog, sprint, and definition of “done” for whole project.

Enterprise Scrum

- Scaling framework for whole organization.
- Disruptive innovation.
- Generalize so they apply to operations.

eXtreme Programming (XP)

Simplicity, courage, respect, communication, feedback

Organizational

- Sit together, whole team, and informative workspace
- Real customer involvement, team continuity, and sustainable pace

Technical

- Incremental design, pair programming, and test-first
- Collective code, code and test documentation, and refactoring

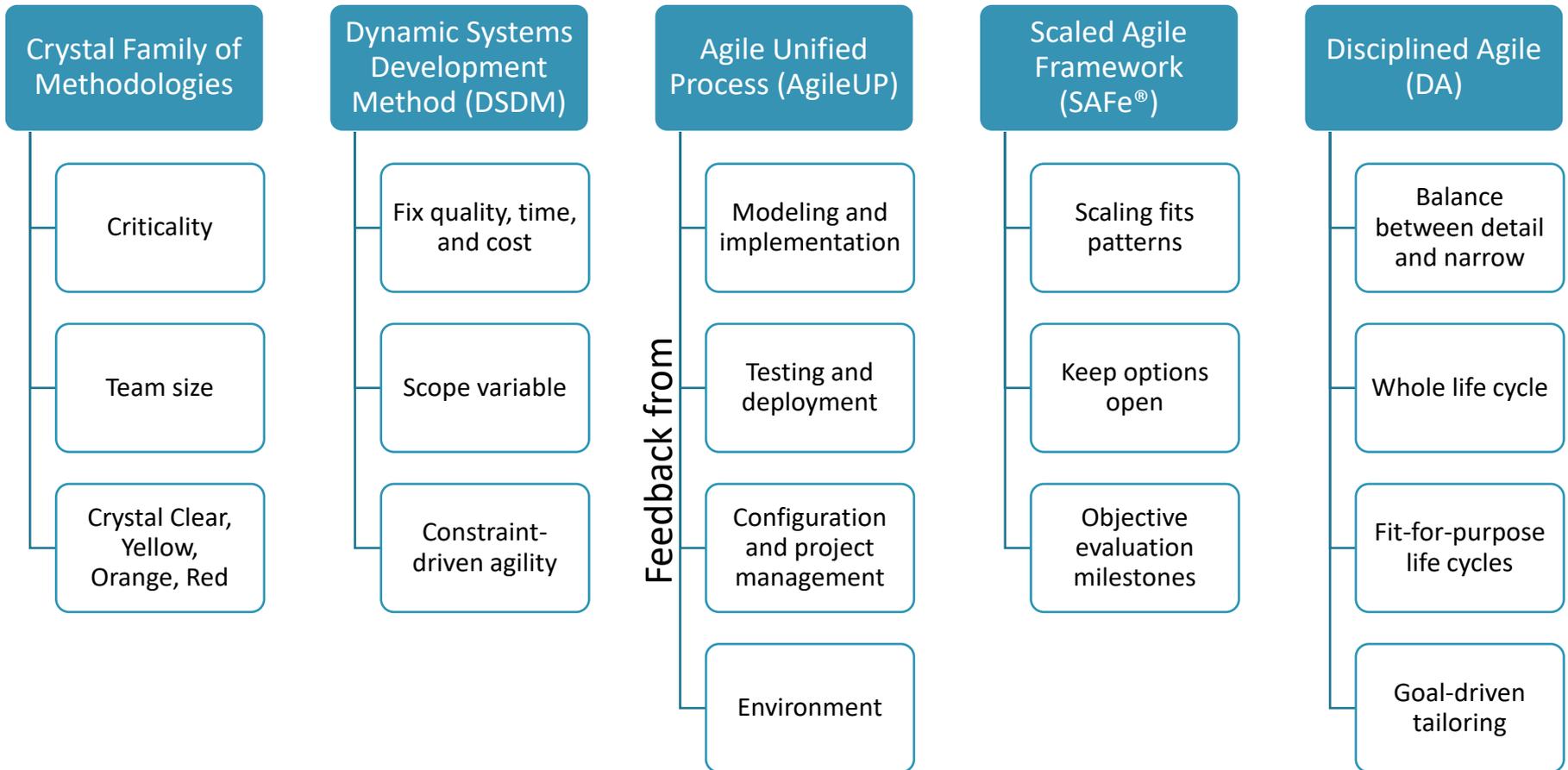
Planning

- User stories, weekly and quarterly cycle, and slack in plans
- Daily standups, root causes, negotiated scope contracts, shrinking teams, and pay-per-use deliverables

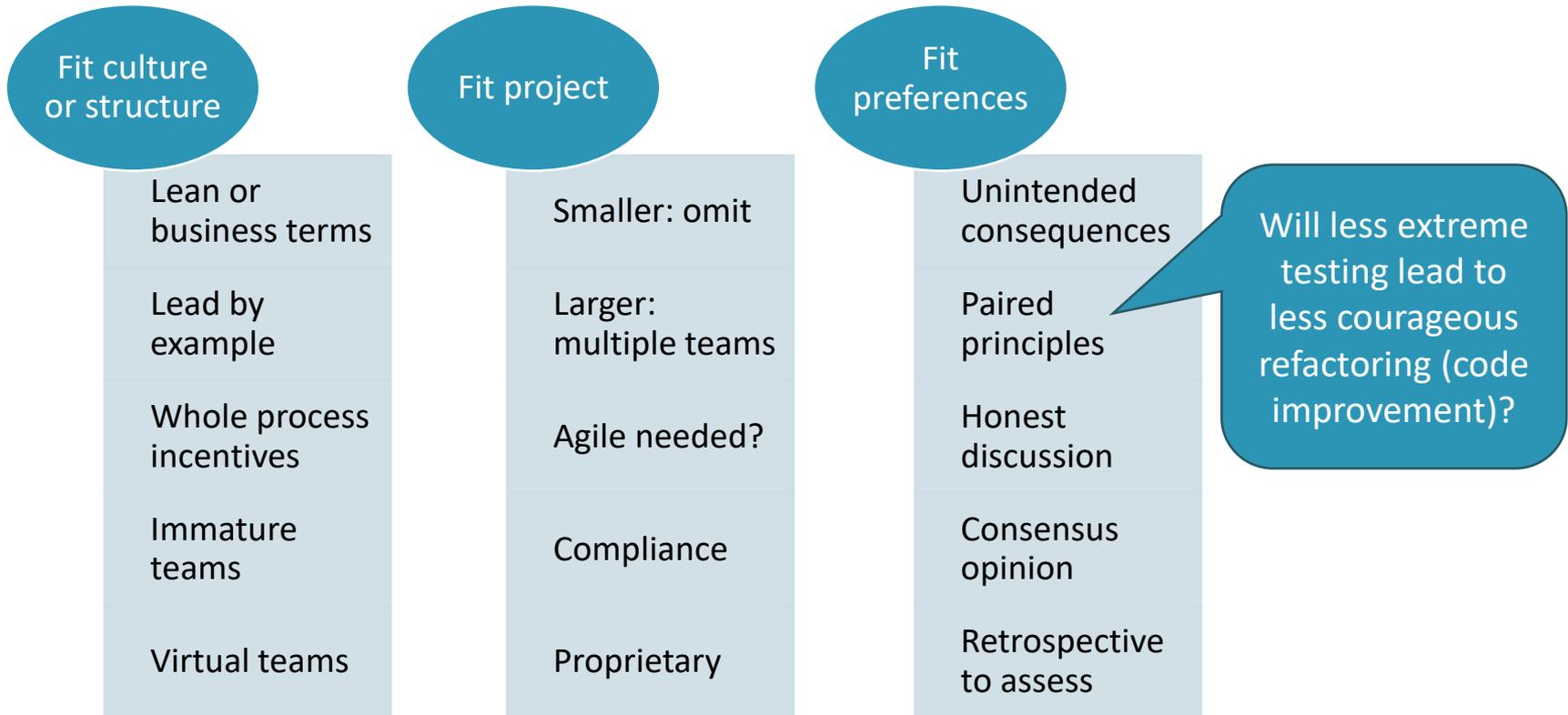
Integration

- Ten-minute build, continuous integration, and test-first mentality
- Incremental deployment, daily deployment, and single code base

Other Agile Frameworks



Tailoring Agile Frameworks: Fit for Purpose?



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CHAPTER

5

Project
Artifacts

External Environment

Marketplace
conditions

Social and cultural
influences and
issues

Regulatory
environment

Commercial
databases

Academic research

Industry standards

Financial
considerations

Physical
environment

Internal Environment

Process assets

Governance
documentation

Data assets

Knowledge assets

Security and safety

Organizational
culture, structure,
and governance

Geographic
distribution of
facilities and
resources

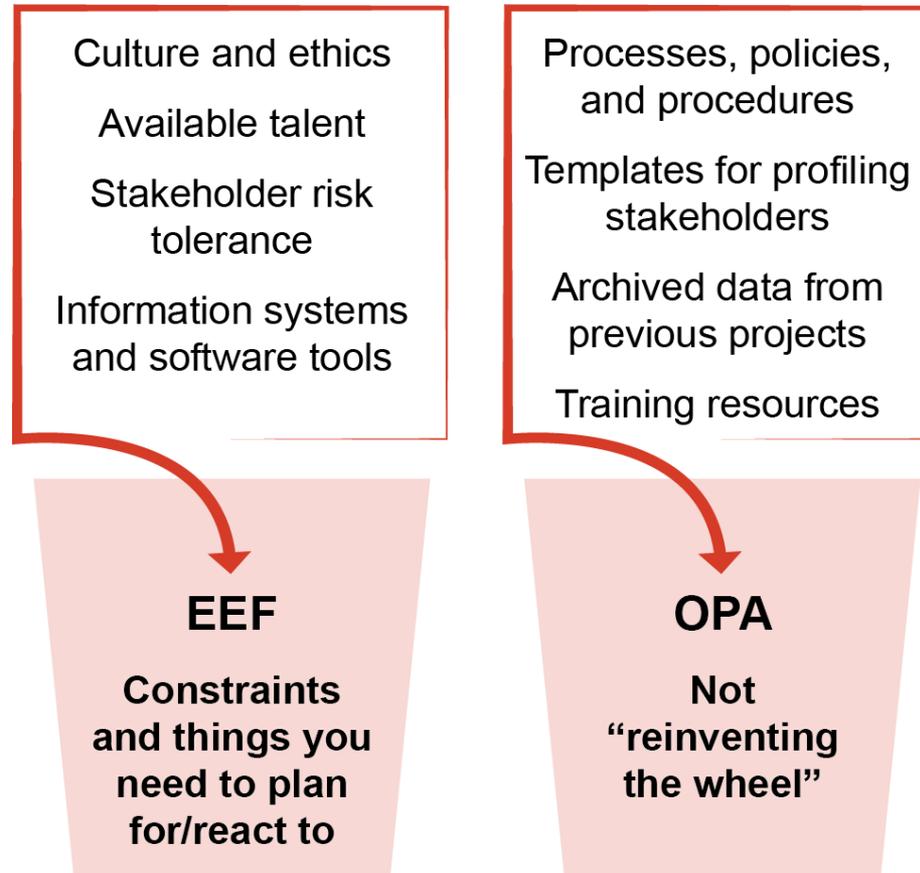
Infrastructure

IT software

Resource
availability

Employee
capability

Enterprise Environmental Factors versus Organizational Process Assets



Enterprise Environmental Factors (EEFs)

Conditions, not under control of team, “that **influence, constrain, or direct** project, program, or portfolio.”

- Organizational culture, governance, communications, structure
- Infrastructure and locations
- Existing human resources
- Tools and resources (e.g., PMIS, commercial databases)
- Personnel and work authorization systems
- External forces (e.g., market, regulation)

Source: This definition is taken from the Glossary of the Project Management Institute, *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)—Sixth Edition*, Project Management Institute, Inc., 2017. Material from this publication has been reproduced with the permission of PMI.



Discussion Question

Why is a project management information system considered an EEF?

- A. Its use may be required throughout the organization.
- B. It is an externally produced tool.
- C. The choice of PMIS is a culturally driven decision.
- D. The organization has purchased it as a tool.

Organizational Process Assets (OPAs)

“Plans, processes, policies, procedures, and knowledge bases...specific to...the performing organization.”

- Policies (e.g., human resources, health and safety, quality)
- Standard procedures and guidelines for implementation
- Templates and standardized documents
- Control procedures (e.g., change control; financial, quality, risk management)
- Organization database (e.g., financial records, lessons learned)

Source: This definition is taken from the Glossary of the Project Management Institute, *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)—Sixth Edition*, Project Management Institute, Inc., 2017. Material from this publication has been reproduced with the permission of PMI.

Organizational Knowledge Base

- Historical data from previous projects (e.g., costs, performance reviews, risk registers)
- Documents from current project not subject to change (e.g., meeting minutes)
- Lessons learned (e.g., project debriefs)

Just a few uses:

- Estimating durations and costs
- Assembling teams
- Identifying sellers and preparing procurement documents
- Developing risk management strategies



Discussion Question

EEFs or OPAs?

- A. Procedure for identifying and analyzing project risk
- B. Senior management attitude toward risk
- C. Tool to assess and prioritize risk
- D. Potential action by competitor

Configuration Management

- Control of changes to the deliverable and/or its components.
- Integrated change control for configuration includes:
 - Identifying configurable items.
 - Maintaining version control.
 - Verifying and auditing configuration.

MODULE
3

Process—
Design

CHAPTER

6

Measurement
Performance Domain

Measurement

Metrics	Benchmarks	Key Performance Indicators (KPIs)
<ul style="list-style-type: none"> • Measurements • Compared to targets, benchmarks, or scales • Indicate level of performance 	<ul style="list-style-type: none"> • Using internal or external comparators (e.g., previous performance, industry leaders) • Analysis of gap between current performance and benchmark • Improvement plan to close gap 	<ul style="list-style-type: none"> • Metrics directly related to project value • Leading indicators: present activity impacting future goals • Lagging indicators: past performance

SMART Success Criteria

Specific

- Clearly defined.

Measurable

- Can be evaluated objectively.

Attainable

- Can be met under current constraints and assumptions.

Relevant

- Support organizational goals.

Time-bound

- Set a deadline for attainment.

Choosing What to Measure

Limit what you measure.

Focus on what is strategically important.

Include stakeholder interests and needs.

Conduct research.

Look to the past and to the future.

Data-Gathering Skills and Techniques

- Identify information needed.
- Obtain it.
- Use to:
 - Define scope.
 - Develop schedules/budgets.
 - Solve problems.
 - Make decisions.

Information can be gathered:

- As part of project's information flow.
- From existing data sources.
- By measurement.

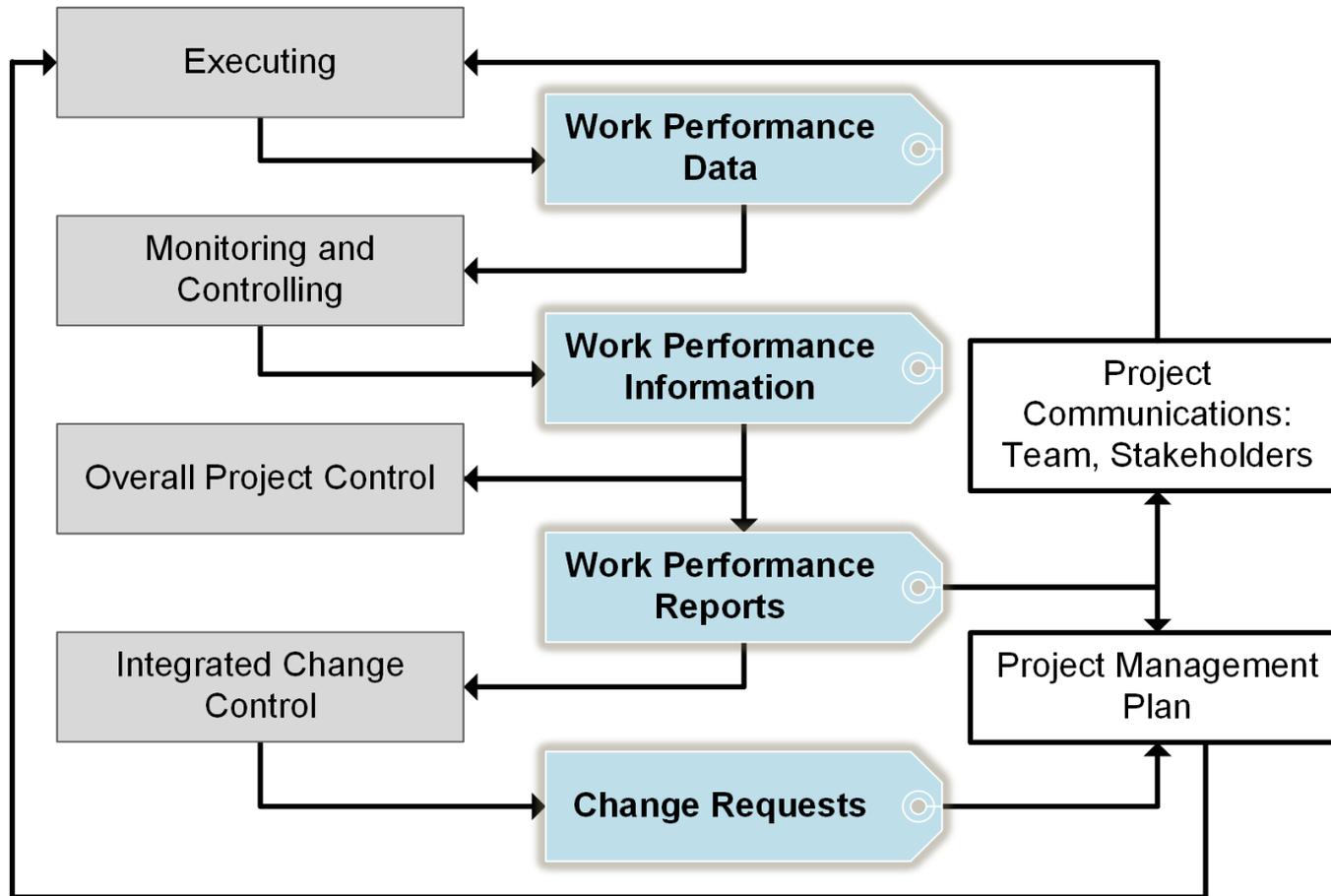
Project Information Flow

How do you know if your project is going according to plan?

You can manage only what you measure through a feedback loop.

- **Work performance data**
- **Work performance information**
- **Work performance reports**

Information Feedback Loop



Data Analysis with the System in Mind

- Considers wide-reaching causes and effects.
- May happen upstream from a project, causing changes to the project, or may happen downstream from a project, where an output affects other areas.
- Considers the larger strategic goals and external perspectives in addition to the internal perspectives of the project team itself.

Data Analysis Tools

SWOT analysis	Identifying strengths, weaknesses, opportunities, threats associated with action or entity
Cost-benefit analysis	Subtracting direct/indirect costs of implementing alternatives from quantifiable/nonquantifiable benefits
Variance analysis	Comparing baseline to actual performance
Affinity relationships	Grouping by similarity
Trend analysis	Identifying patterns and directions in separate data points
Forecasts	Projecting outcomes based on trends
Value stream mapping	Method to document, analyze, and improve flow of information or materials
Information radiators	Visible, physical display that provides information
Cause analysis	Identifying and describing strength of causal relationships
What-if analysis	Comparing the effect of different variables on outcomes

MODULE
3

Process—
Design

CHAPTER

7

Planning
Performance Domain

Business Case

- Value proposition for a proposed project
- Used throughout the project life cycle
- Three main elements:
 - Business need
 - Business strategy
 - Project justification

Opportunity cost

- Resources committed to a project that can't be committed elsewhere

Sunk Cost

- Previous investment made in related project or prior project phase



Discussion Question

What does the term “sunk cost” mean?

- A. Past investment in an initiative that must be considered in deciding to authorize a project
- B. Sum of all economic investments in a project
- C. All previous irretrievable investments in a project
- D. The cumulative losses from projects in this program or portfolio

Feasibility Studies and Needs Analysis

Feasibility Studies

- Can be performed before or during a project
- Answer questions and narrow options
- Can raise issues that will require planning

Needs Analysis

- Often precedes a business case
- May be summarized in the business case
- May offer proposals to address potential issues, opportunities, and business goals

Artifacts

Business
model canvas

Lean startup
canvas

Project brief

Project vision
statement

Strategic
plan

Vision
statement

Roadmap

Project Planning

Planning Roadmap

- Determine development approach.
- Consider project deliverables.
- Consider organizational policies and procedures.
- Consider market conditions.

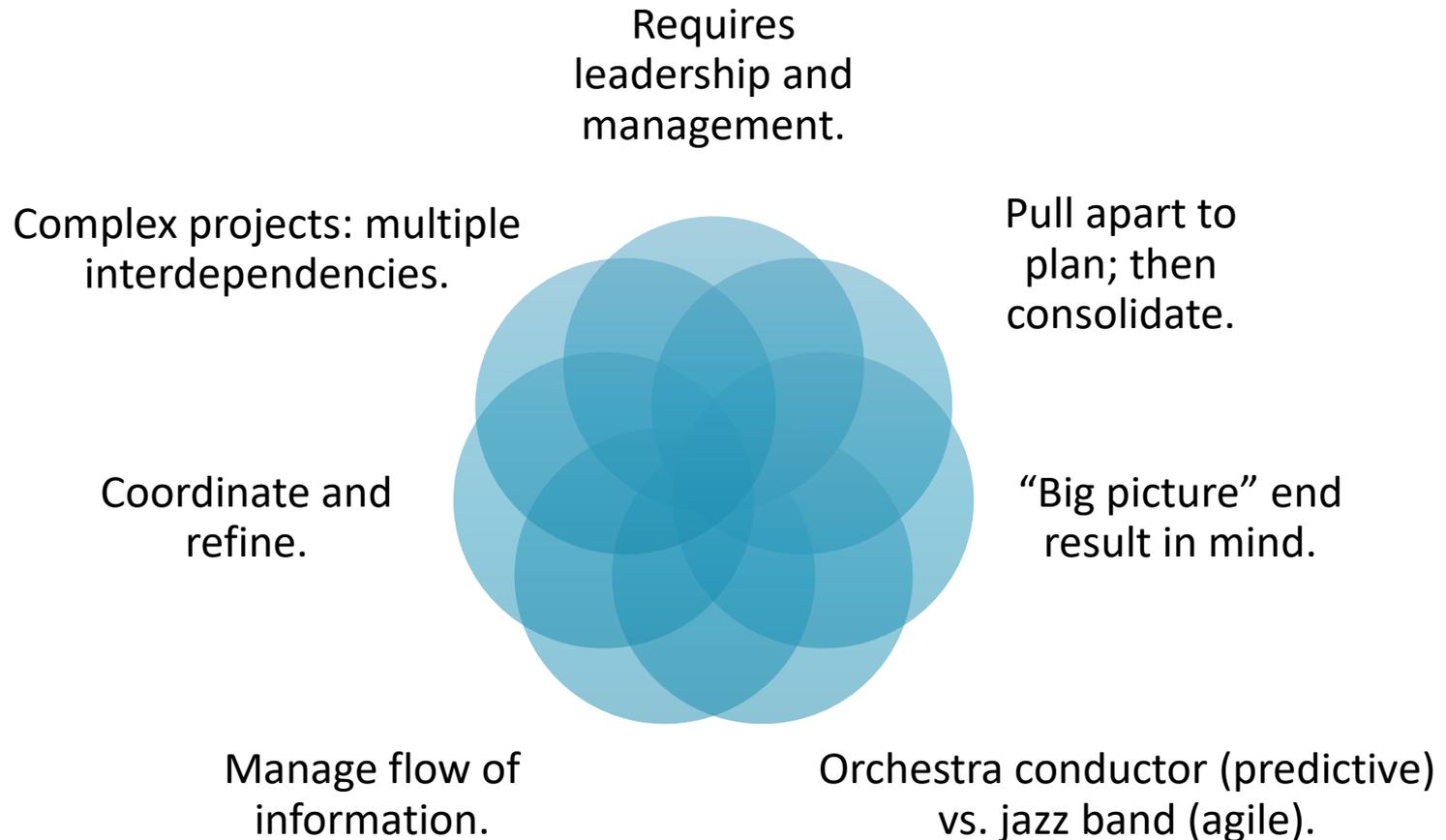
Boehm's Planning Model

- Compares time and effort required in planning.
- Up-front planning may result in less rework, uncertainty, and oversights.
- Costs associated include increased time, potential market share loss, increased risk of change.

Tailoring Planning Performance Domain

- How can project and deliverables be influenced by environment?
- What factors influence direction?
- What guidelines, policies, and procedures are in effect?

Integration Concepts



Predictive: Project Integration Management

KNOWLEDGE AREAS	PROCESS GROUPS				
	Initiating	Planning	Executing	Monitoring and Controlling	Closing
Project Integration Management	<ul style="list-style-type: none"> Develop Project Charter 	<ul style="list-style-type: none"> Develop Project Management Plan 	<ul style="list-style-type: none"> Direct and Manage Project Work Manage Project Knowledge 	<ul style="list-style-type: none"> Monitor and Control Project Work Perform Integrated Change Control 	<ul style="list-style-type: none"> Close Project or Phase

Source: Adapted from Project Management Institute, *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)—Sixth Edition*, Project Management Institute, Inc., 2017, Table 1-4, Page 25. Material from this publication has been reproduced with the permission of PMI.

- Coordination of processes across Process Groups and Knowledge Areas to achieve **seamless interaction**
- A **leadership** activity using team empowerment and communication
- A **management** activity improving efficiency and effectiveness

Agile/Hybrid Project Integration

Integration is collaborative on agile/hybrid projects:

- Scrum masters retain accountability for integration.
- Product owners and Scrum masters:
 - Big-picture view of overall integration and business needs.
 - Focus on promoting collaborative decision making.
 - Ensure that team can respond to changes.
- Team members:
 - Big-picture view of technical aspects and dependencies.
 - Contribute expert judgment on how to integrate specifics.
 - Empowered to decide on detailed integration.

Agile/Hybrid Project Integration

- Integrate early and often.
- Integration tests part of definition of “done.”
- Relies heavily on testing, software examples:
 - Acceptance test-driven development (ATDD)
 - Continuous integration
- Non-software agile integration
 - Stories “done” analysis used to modify backlog stories
 - Checking that engineer-to-order parts will fit together
 - Simulations of designs or 3D walkthroughs

Agile Roadmaps

Big-picture strategic plan with vision;
focus on outcomes, not outputs.

Kanban
board with
just themes
with epics.

Reprioritize
or add/
remove as
needed.

Planning
process
more
important
than plan.

Avoid
artificial
timeline or
“TMI”
paralysis.

Agile “Lightweight” Project Charters

Vision (why best opportunity or needed)

Mission (what end results)

Benefits and business value

Success criteria (can change during project)

System impacts, assumptions, exclusions, and risks

Teams use these inputs to “tee-shirt-size” scope; then progressively elaborate scope during iterations.

MODULE
3

Process—
Design

CHAPTER

8

Predictive Project Integration

Predictive: Develop Project Charter

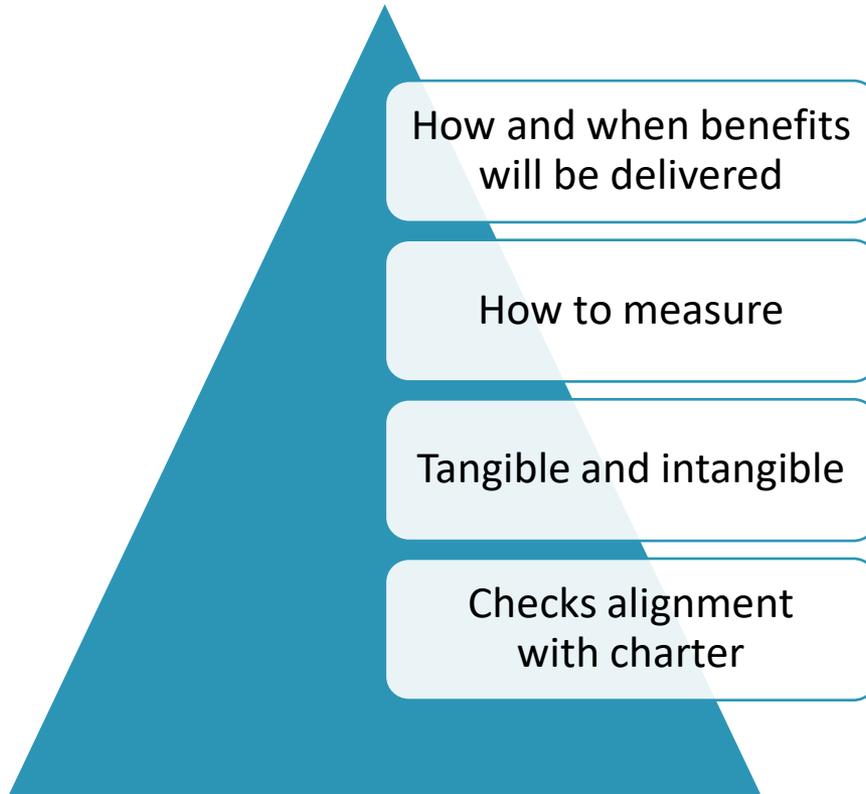


Source: Adapted from Project Management Institute, *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)—Sixth Edition*, Project Management Institute, Inc., 2017, Figure 4-2, Page 75. Material from this publication has been reproduced with the permission of PMI.

- Formally authorizes project
- Assigns budget and control authority and responsibility to project manager
- Defines high-level objectives and scope to the degree feasible

Other Inputs to Chartering

Benefits Management Plan



Agreements

- Memoranda of understanding (MOUs)
- Service level agreements (SLAs)
- Letters of intent
- Characteristics:
 - Consideration or money
 - Legal agreement
 - Input to Initiating
 - Obligations

Project Charter Benefits



Project Charter Components

- Business problem being solved
- Objectives and success criteria
- High-level requirements, description, risks
- Summary budget and schedule
- Assumptions and constraints
- Stakeholder list
- Project manager and sponsor

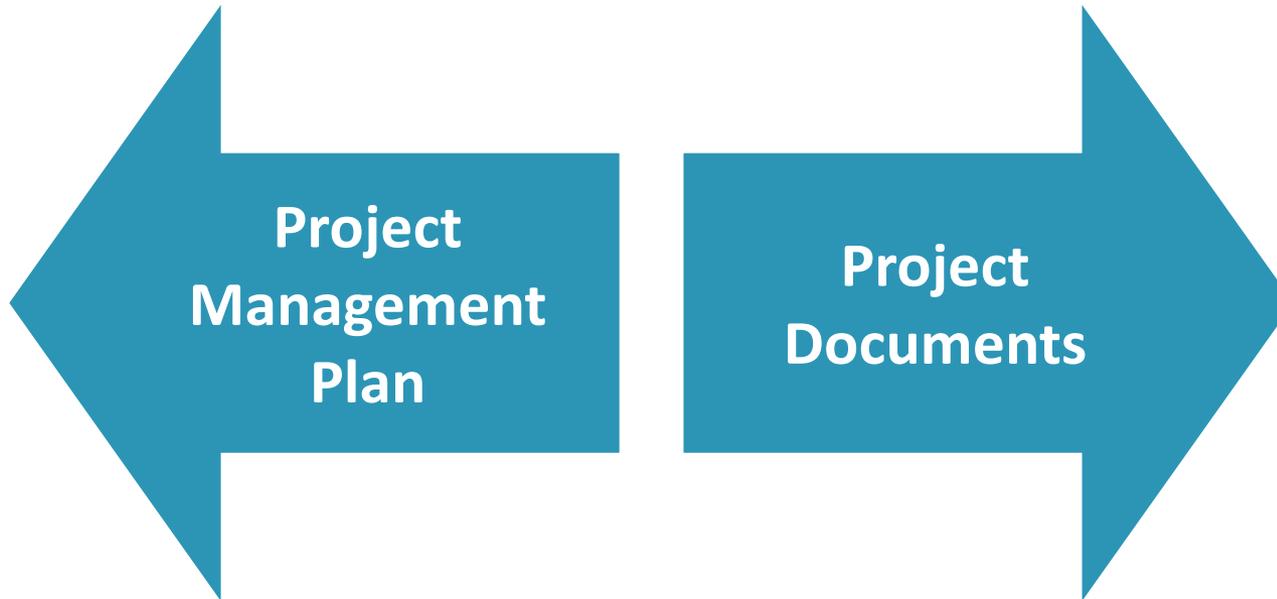
Predictive: Develop Project Management Plan



Source: Adapted from Project Management Institute, *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)—Sixth Edition*, Project Management Institute, Inc., 2017, Figure 4-4, Page 82. Material from this publication has been reproduced with the permission of PMI.

- Defines, prepares, and coordinates all subsidiary plans and consolidates them into a comprehensive **project management plan** for predictive projects
- Central document that is the basis of all project work

Project Management Plan and Project Documents



**Project
Management
Plan**

**Project
Documents**

A **guide** to creating a set of detailed project documents

Data about various aspects of project activities



Discussion Question

Where would you find the following items?

- A. Change management plan
- B. Change log
- C. Milestone list
- D. Schedule baseline
- E. Risk register
- F. Process improvement plan

Guidance in the Project Management Plan

Why

- Project goal; supports strategic alignment

What

- Everything that must be done
- Information that must be gathered

How

- Plans for each Knowledge Area for Executing, Monitoring/Controlling, and Closing

Who

- Project leader and key positions

Where

- Regions or divisions where work will be performed

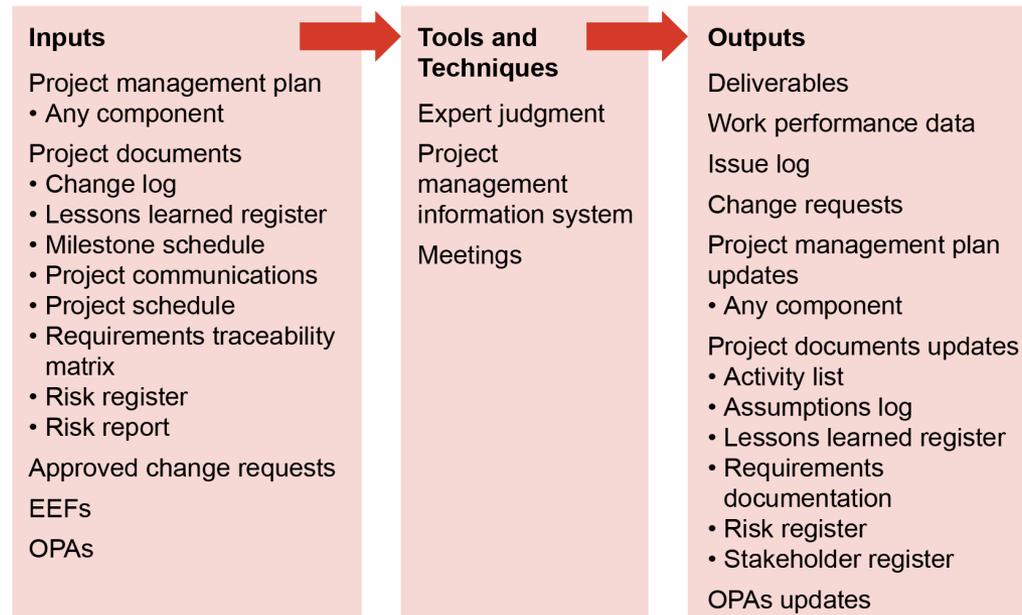
When

- Activity starts and completions, deliverable dates

Project Management Plan Benefits

- “Living” document
- Reduces conflicts
- Increases consistency and reliability of communications
- Earlier identification and better management of risks
- Definitive baselines for measurement of project success

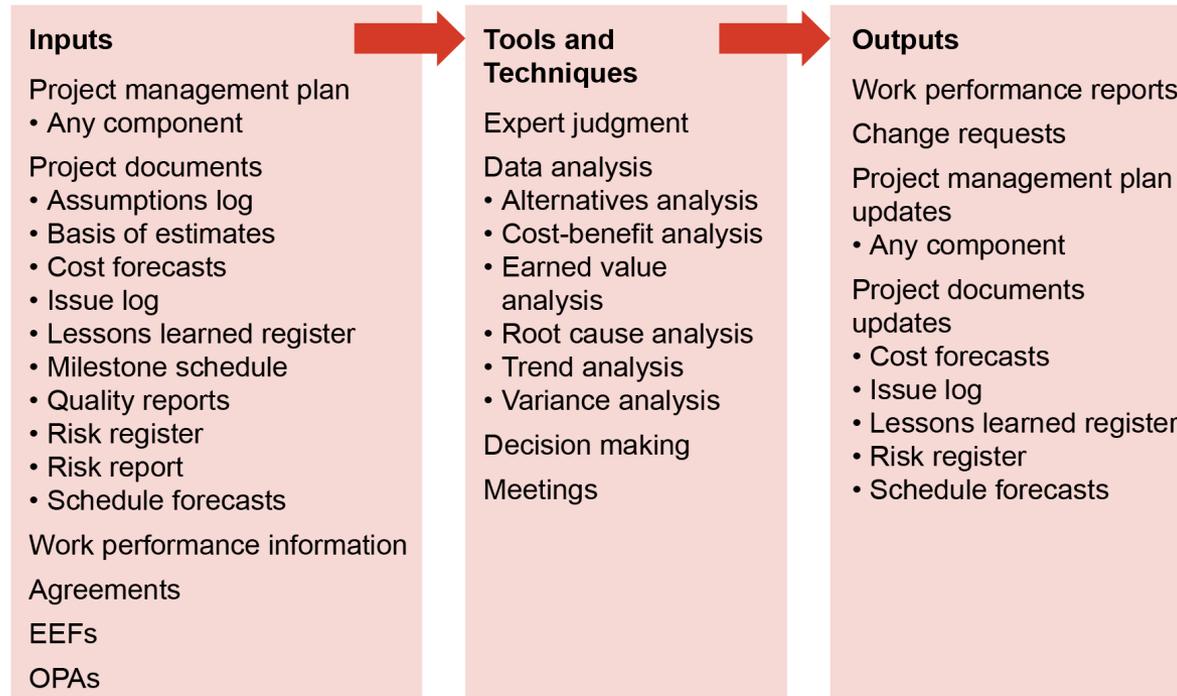
Predictive: Direct and Manage Project Work



Source: Adapted from Project Management Institute, *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)—Sixth Edition*, Project Management Institute, Inc., 2017, Figure 4-6, Page 90. Material from this publication has been reproduced with the permission of PMI.

- Manage all areas and changes
- OPA tools for project management (e.g., templates)
- Plan and document updates

Predictive: Monitor and Control Project Work



Source: Adapted from Project Management Institute, *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)—Sixth Edition*, Project Management Institute, Inc., 2017, Figure 4-10, Page 105. Material from this publication has been reproduced with the permission of PMI.

- Analyzing work performance information to determine need for and impacts of changes

Distinct Tasks for Project Manager

Monitor

- Turn work performance information into work performance reports.
- Maintain accurate and timely information on progress.

Control

- Continue on course or correct course through change requests.
- Validate work directives and changes.