Software Project Management

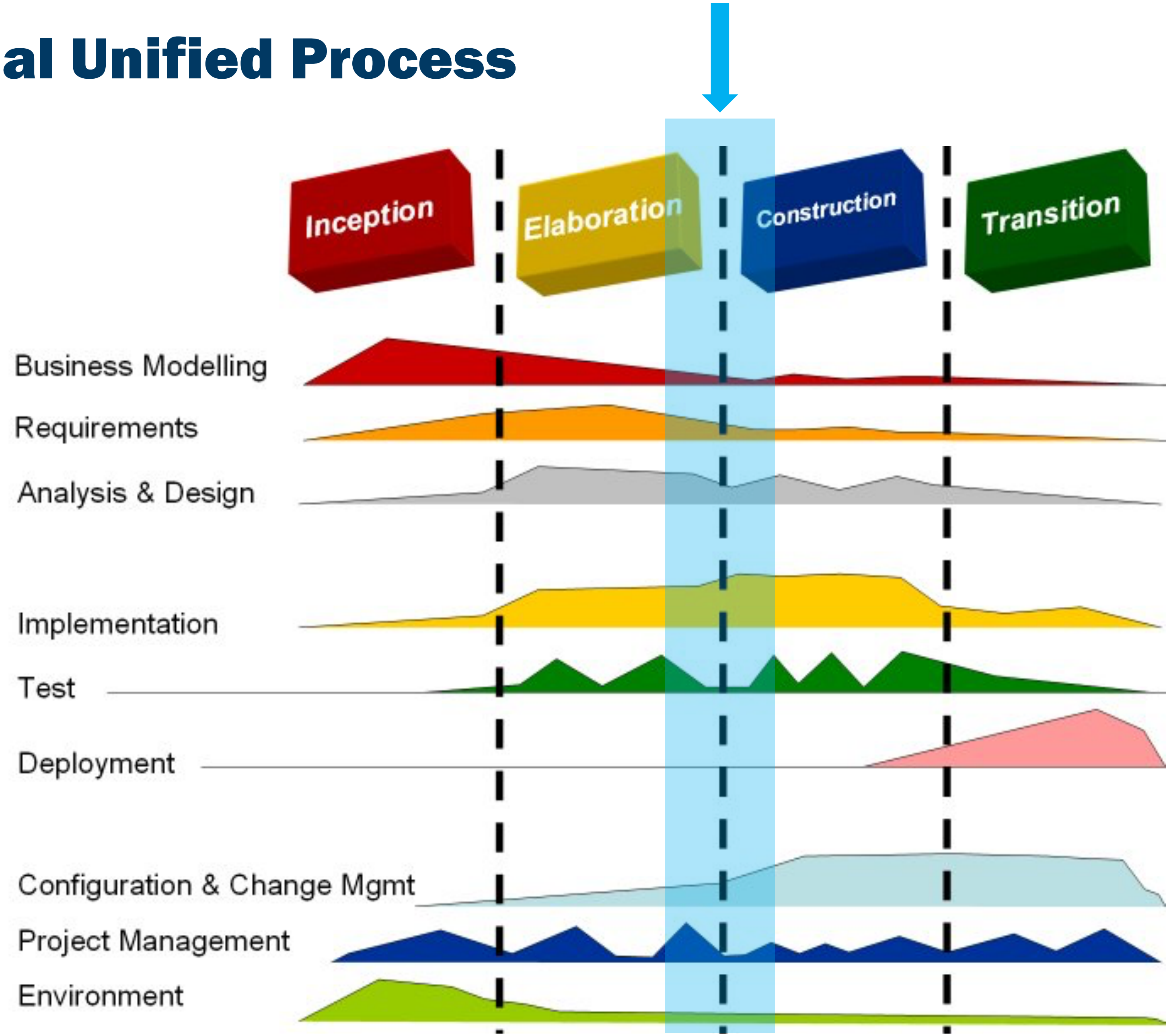
FEUP-MIEIC-ESOF-2019-20

Ademar Aguiar

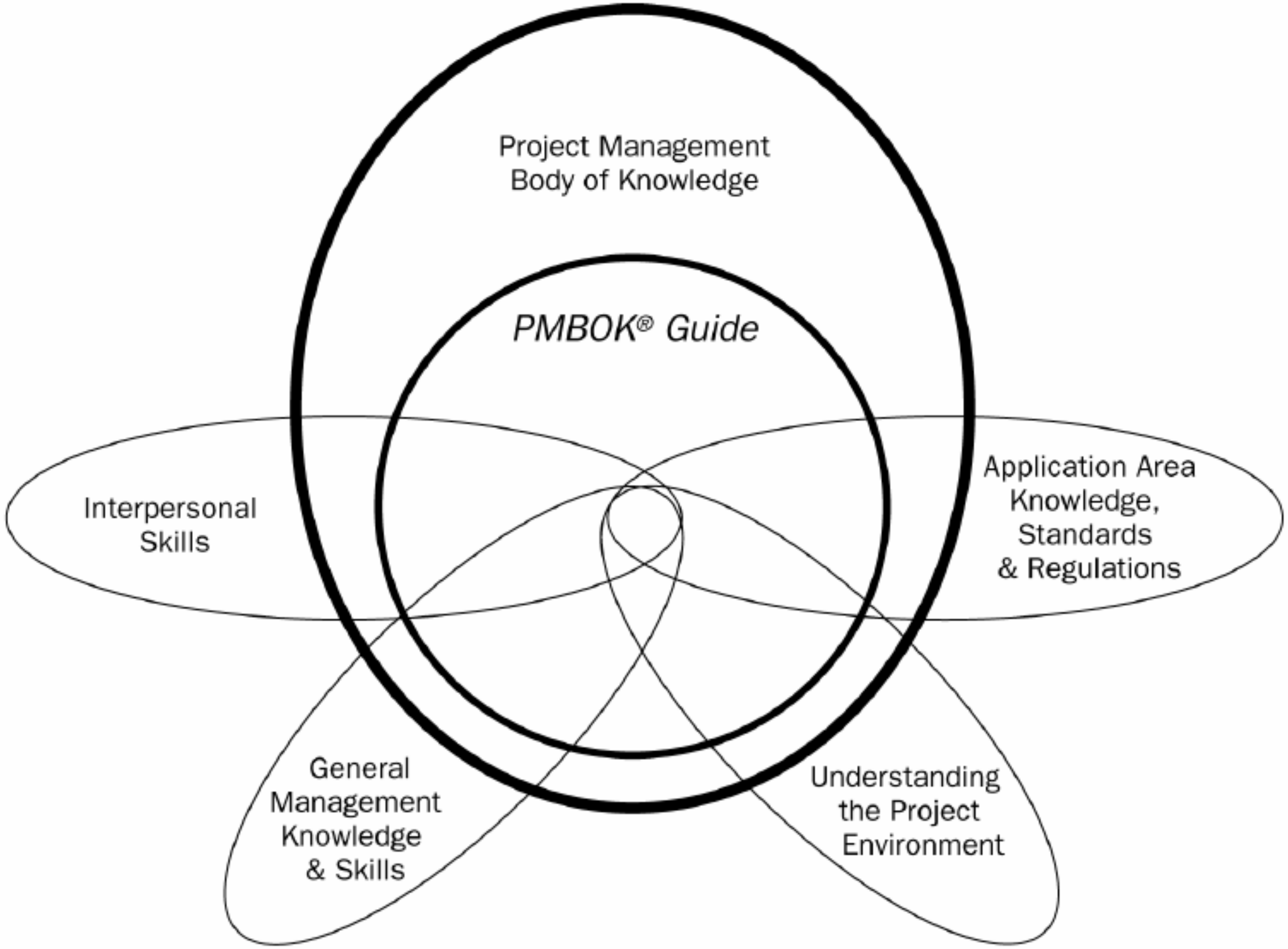
U. PORTO

FEUP FACULDADE DE ENGENHARIA
UNIVERSIDADE DO PORTO

Rational Unified Process

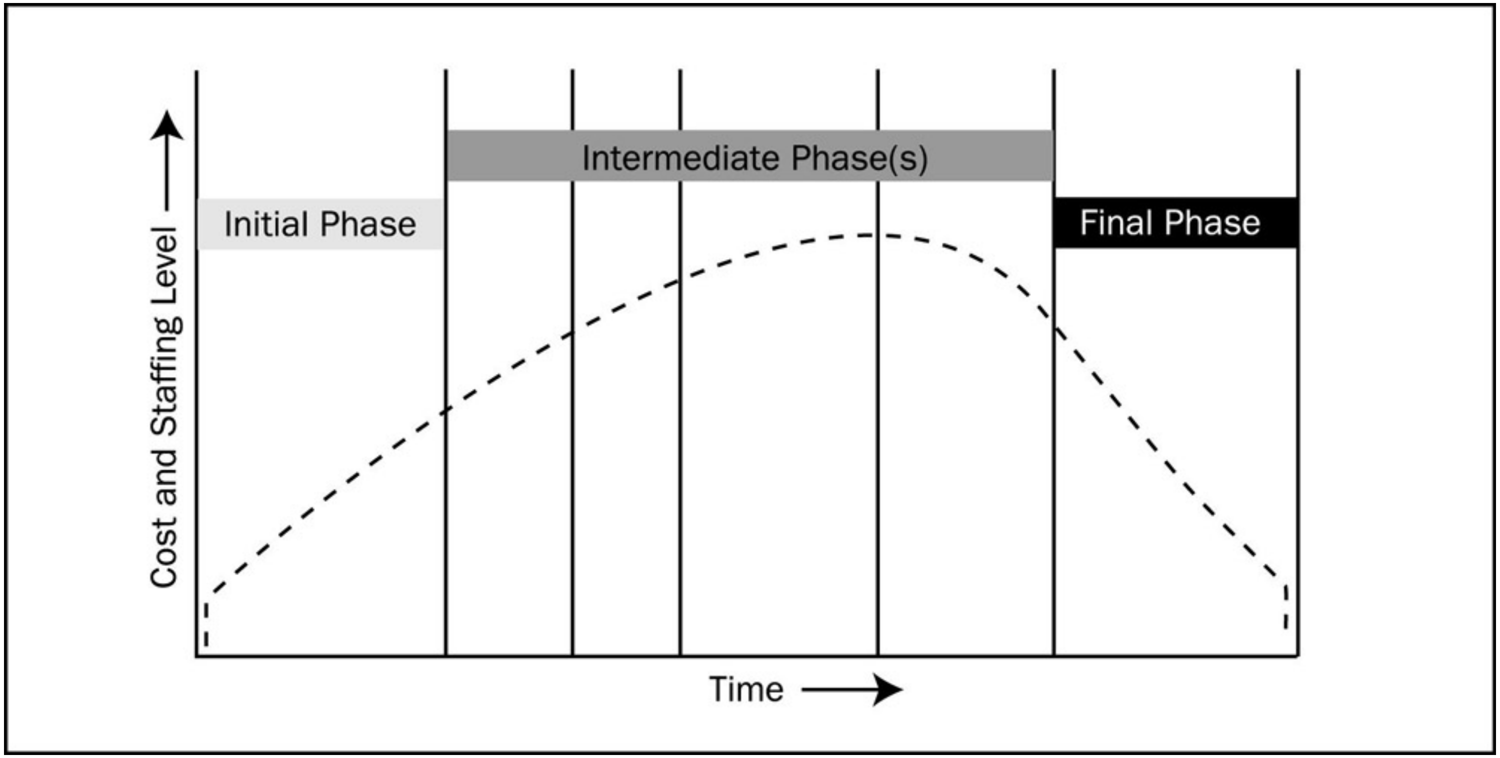


Areas of Expertise

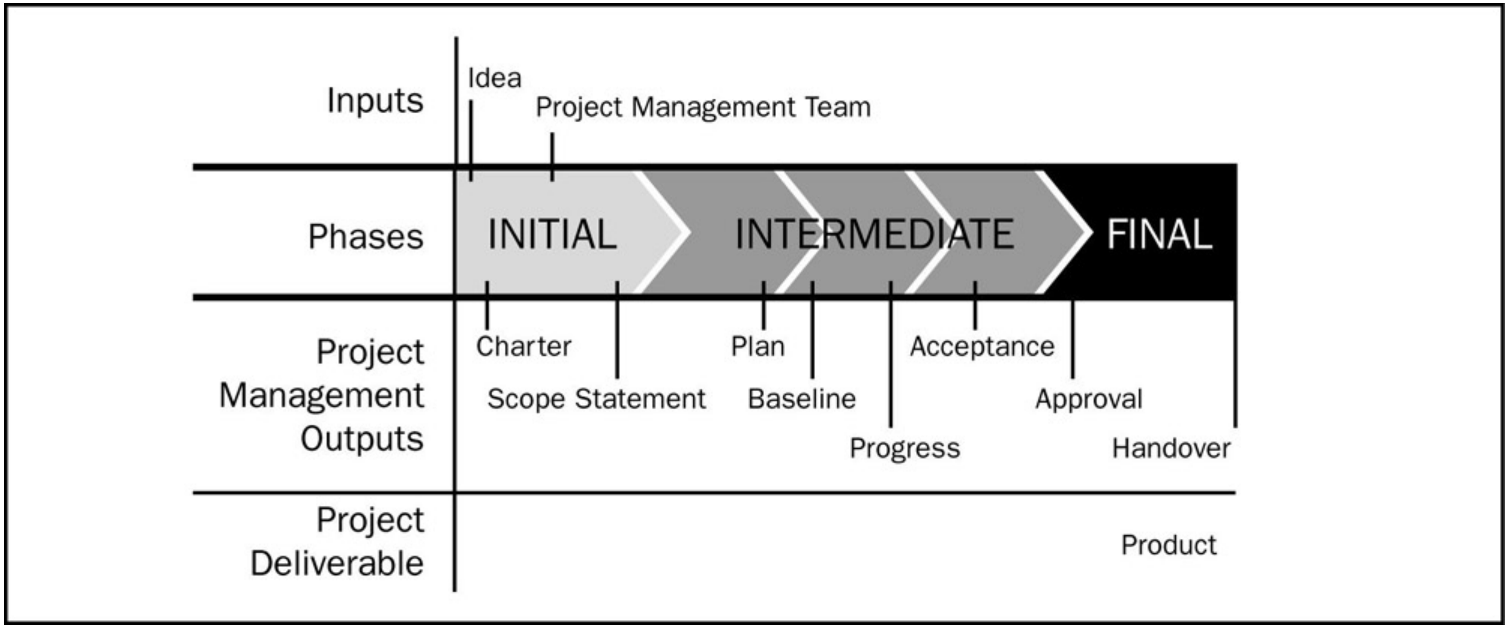

Project Management Body of Knowledge
PMBOK® Guide
Interpersonal Skills
Application Area Knowledge, Standards & Regulations
General Management Knowledge & Skills
Understanding the Project Environment

From “*A Guide to the Project Management Body of Knowledge (PMBOK® Guide)* Third Edition”

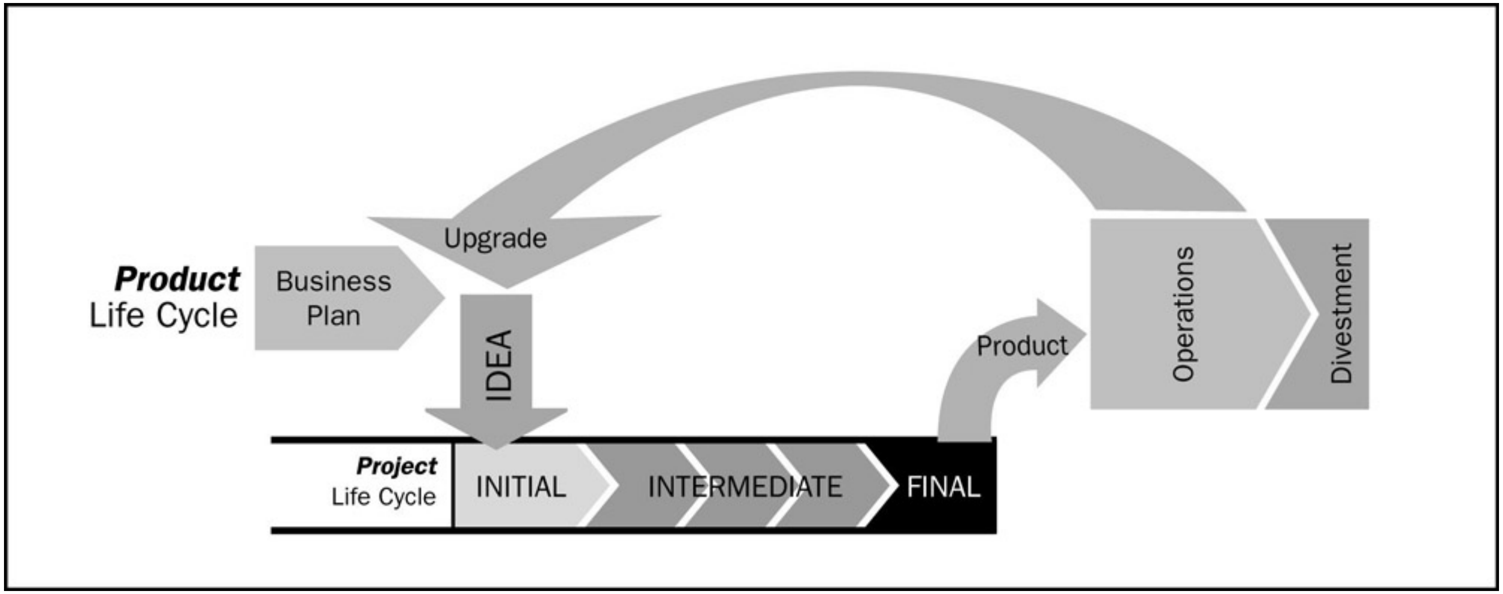
Project Cost and Staffing Levels



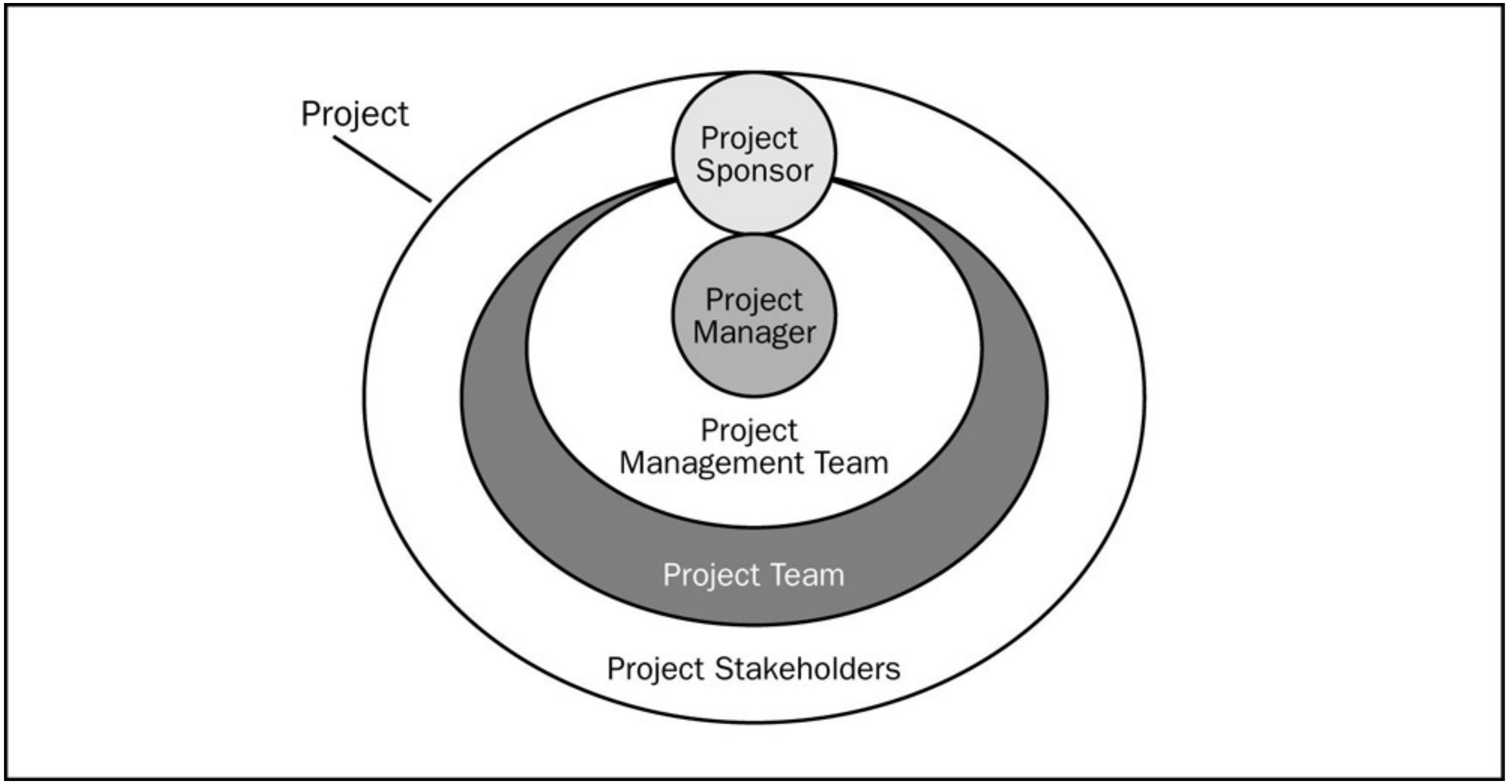
Typical Sequence of Phases



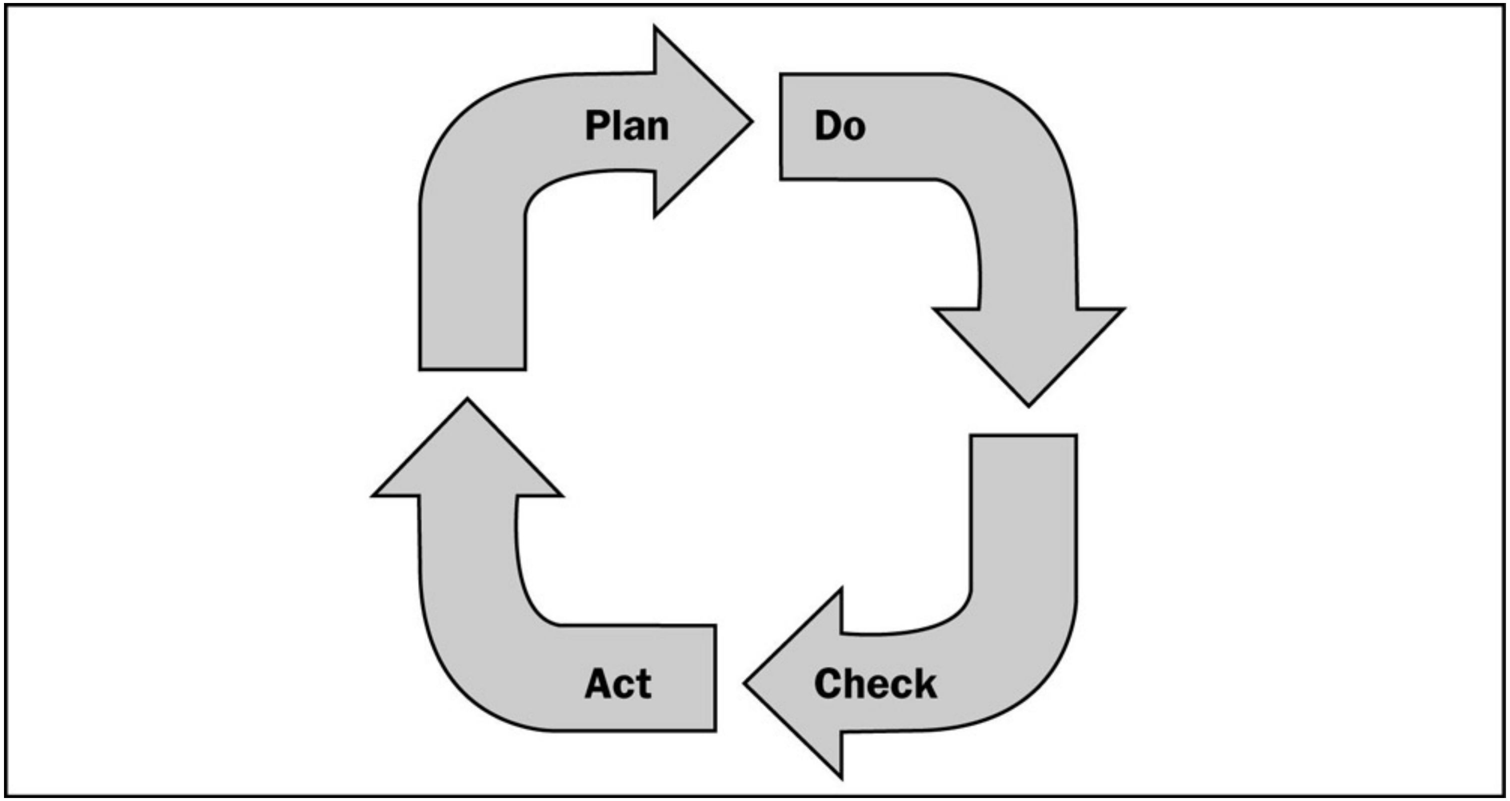
Product and the Project Life Cycles



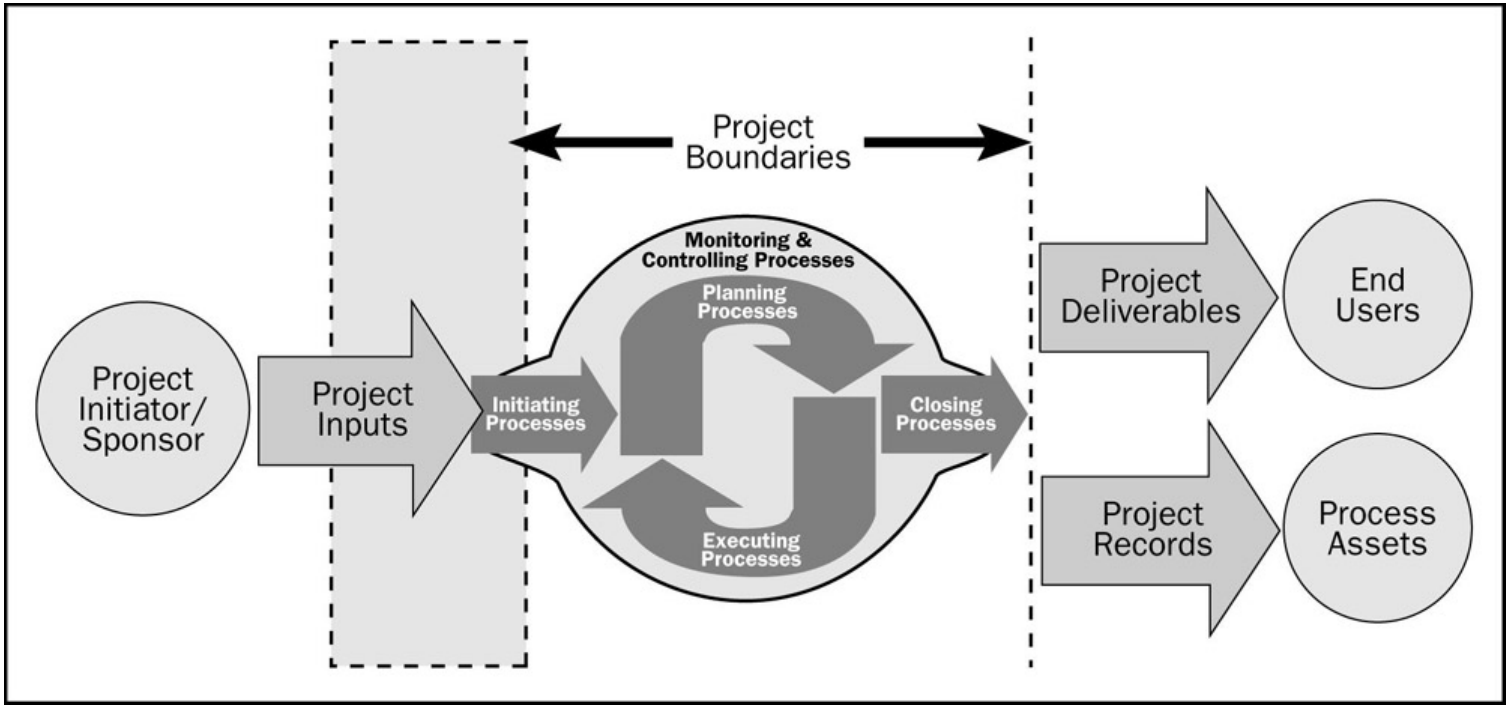
Project Stakeholders



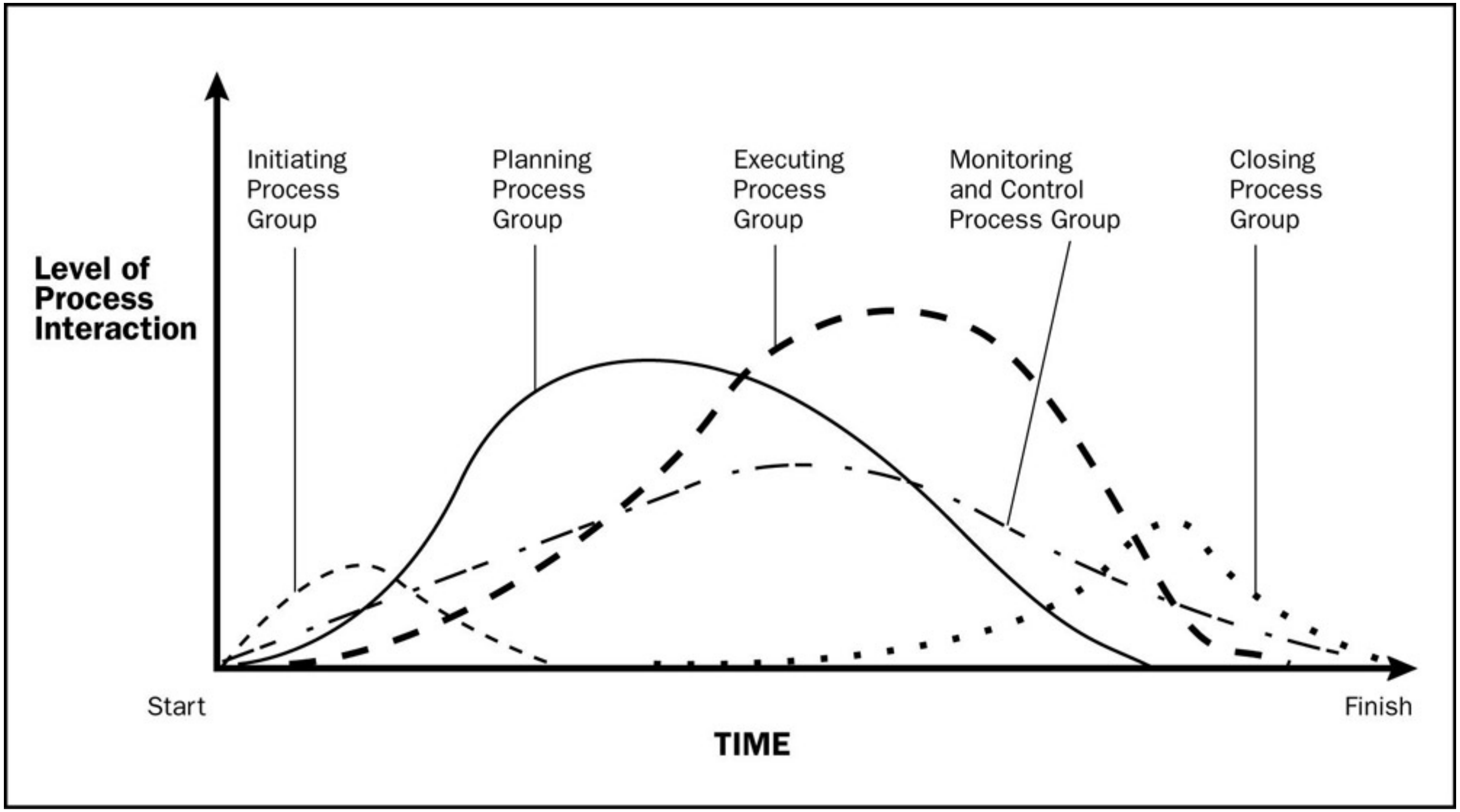
Plan-Do-Check-Act Cycle



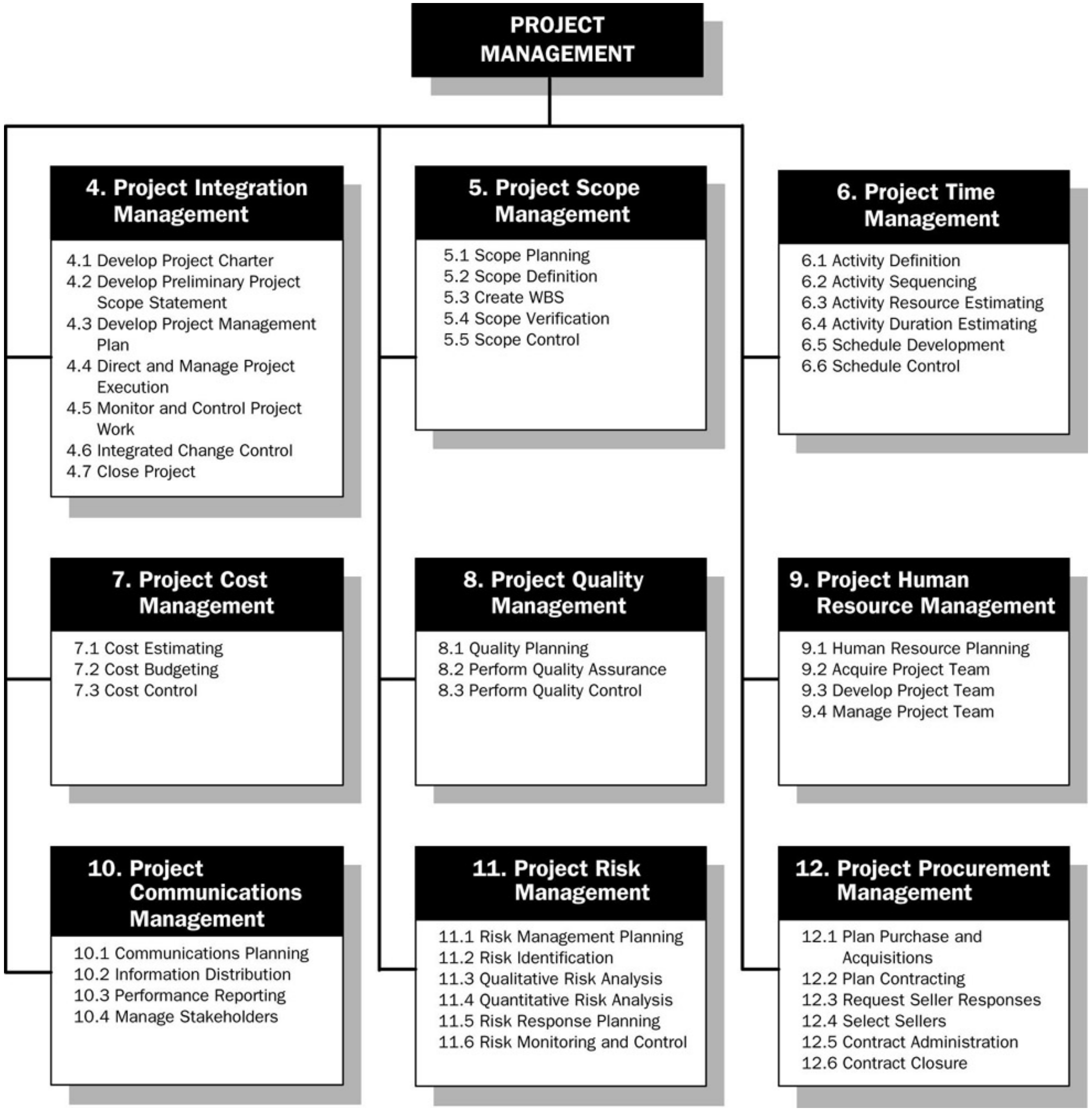
Project Boundaries



Process Interactions



PMBOK Guide



PROJECT MANAGEMENT

4. Project Integration Management

4.1 Develop Project Charter
4.2 Develop Preliminary Project Scope Statement
4.3 Develop Project Management Plan
4.4 Direct and Manage Project Execution
4.5 Monitor and Control Project Work
4.6 Integrated Change Control
4.7 Close Project

5. Project Scope Management

5.1 Scope Planning
5.2 Scope Definition
5.3 Create WBS
5.4 Scope Verification
5.5 Scope Control

6. Project Time Management

6.1 Activity Definition
6.2 Activity Sequencing
6.3 Activity Resource Estimating
6.4 Activity Duration Estimating
6.5 Schedule Development
6.6 Schedule Control

7. Project Cost Management

7.1 Cost Estimating
7.2 Cost Budgeting
7.3 Cost Control

8. Project Quality Management

8.1 Quality Planning
8.2 Perform Quality Assurance
8.3 Perform Quality Control

9. Project Human Resource Management

9.1 Human Resource Planning
9.2 Acquire Project Team
9.3 Develop Project Team
9.4 Manage Project Team

10. Project Communications Management

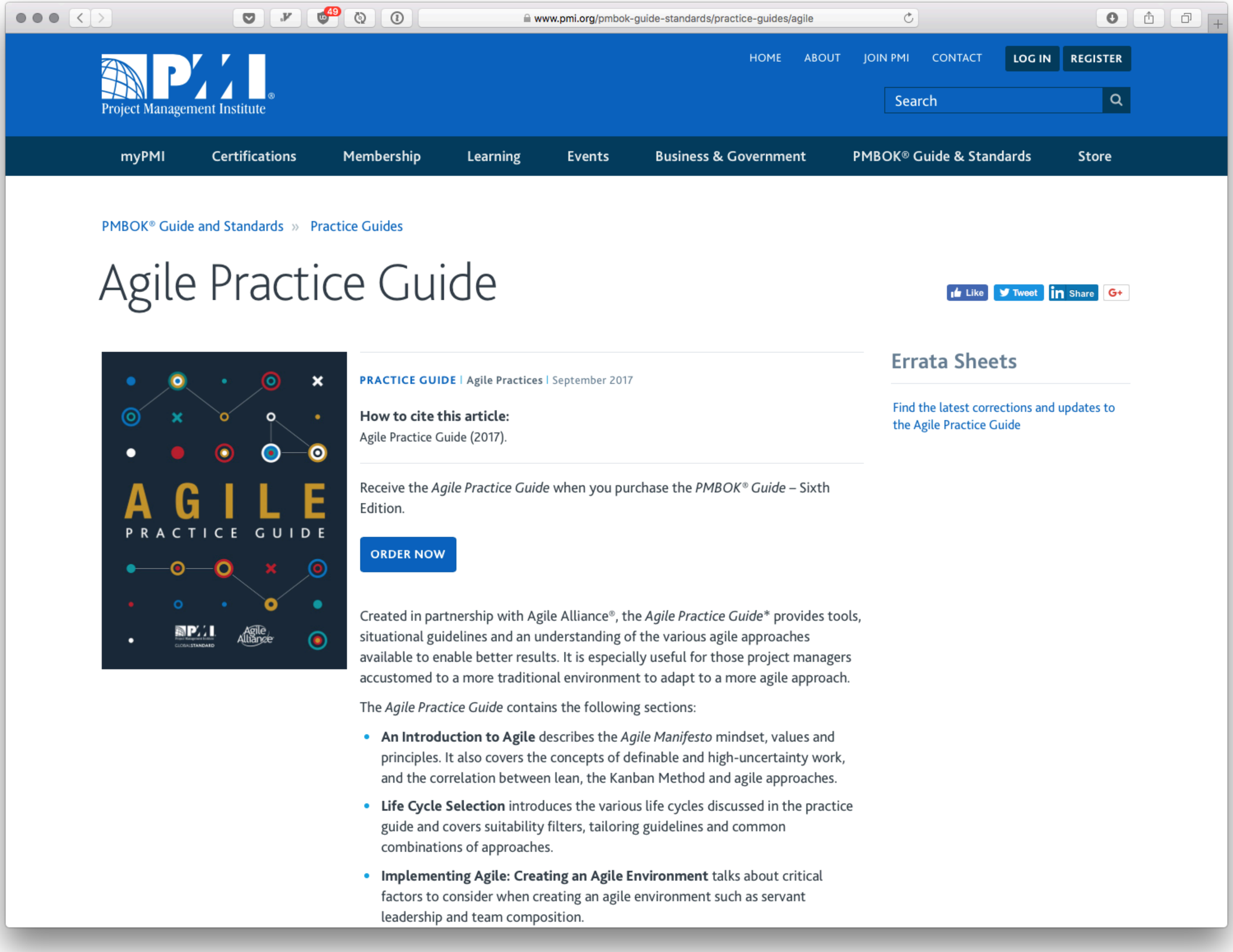
10.1 Communications Planning
10.2 Information Distribution
10.3 Performance Reporting
10.4 Manage Stakeholders

11. Project Risk Management

11.1 Risk Management Planning
11.2 Risk Identification
11.3 Qualitative Risk Analysis
11.4 Quantitative Risk Analysis
11.5 Risk Response Planning
11.6 Risk Monitoring and Control

12. Project Procurement Management

12.1 Plan Purchase and Acquisitions
12.2 Plan Contracting
12.3 Request Seller Responses
12.4 Select Sellers
12.5 Contract Administration
12.6 Contract Closure



PMBOK® Guide and Standards » Practice Guides

Agile Practice Guide

PRACTICE GUIDE | Agile Practices | September 2017

How to cite this article:
Agile Practice Guide (2017).

Receive the *Agile Practice Guide* when you purchase the *PMBOK® Guide* – Sixth Edition.

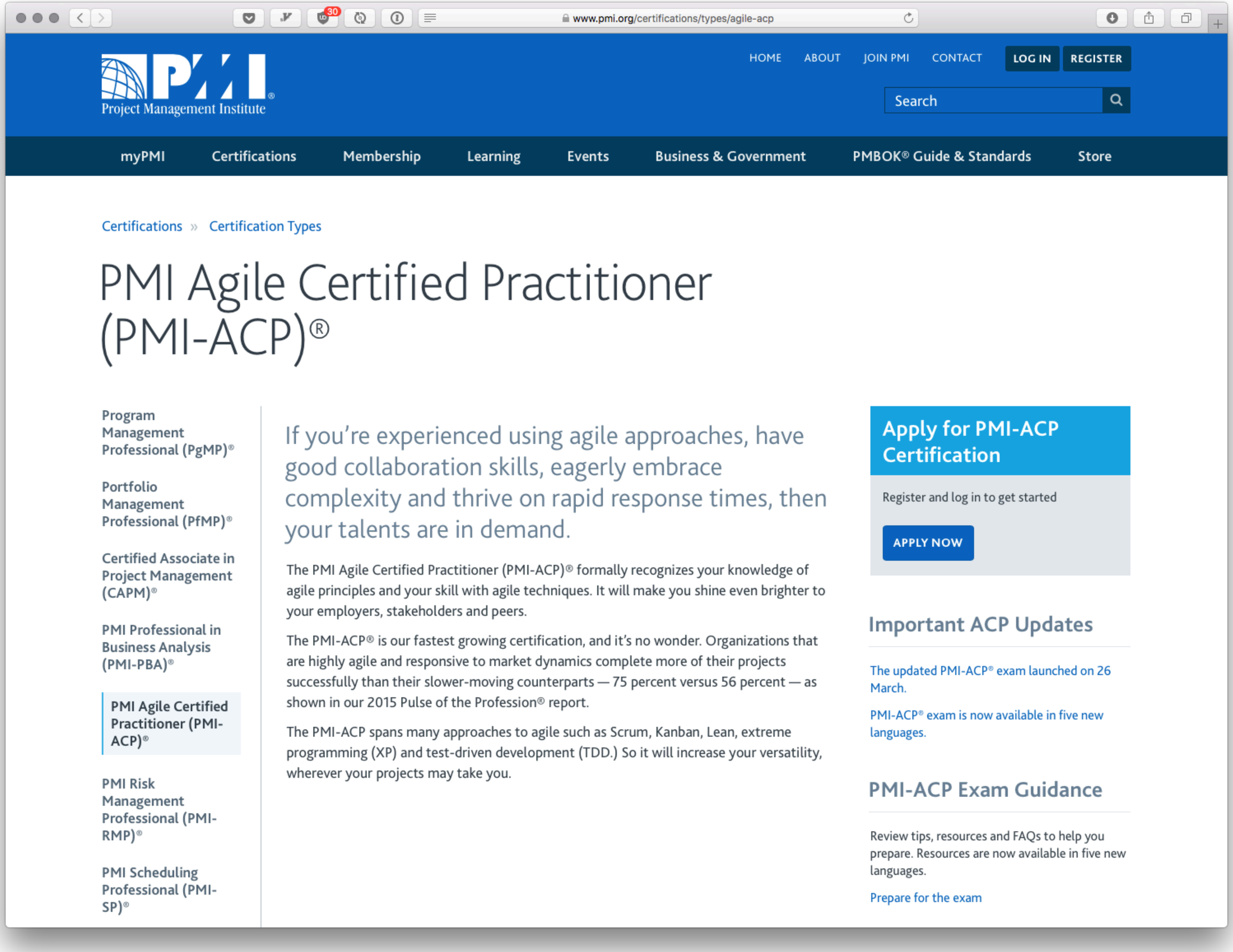
Created in partnership with Agile Alliance®, the *Agile Practice Guide** provides tools, situational guidelines and an understanding of the various agile approaches available to enable better results. It is especially useful for those project managers accustomed to a more traditional environment to adapt to a more agile approach.

The *Agile Practice Guide* contains the following sections:

- **An Introduction to Agile** describes the *Agile Manifesto* mindset, values and principles. It also covers the concepts of definable and high-uncertainty work, and the correlation between lean, the Kanban Method and agile approaches.
- **Life Cycle Selection** introduces the various life cycles discussed in the practice guide and covers suitability filters, tailoring guidelines and common combinations of approaches.
- **Implementing Agile: Creating an Agile Environment** talks about critical factors to consider when creating an agile environment such as servant leadership and team composition.

Errata Sheets

Find the latest corrections and updates to the Agile Practice Guide


www.pmi.org/certifications/types/agile-acp
Project Management Institute
HOME
ABOUT
JOIN PMI
CONTACT
LOG IN
REGISTER
Search
myPMI
Certifications
Membership
Learning
Events
Business & Government
PMBOK® Guide & Standards
Store
Certifications » Certification Types
Program Management Professional (PgMP)®
Portfolio Management Professional (PfMP)®
Certified Associate in Project Management (CAPM)®
PMI Professional in Business Analysis (PMI-PBA)®
PMI Agile Certified Practitioner (PMI-ACP)®
PMI Risk Management Professional (PMI-RMP)®
PMI Scheduling Professional (PMI-SP)®
APPLY NOW

PMI Agile Certified Practitioner (PMI-ACP)®

If you're experienced using agile approaches, have good collaboration skills, eagerly embrace complexity and thrive on rapid response times, then your talents are in demand.

The PMI Agile Certified Practitioner (PMI-ACP)® formally recognizes your knowledge of agile principles and your skill with agile techniques. It will make you shine even brighter to your employers, stakeholders and peers.

The PMI-ACP® is our fastest growing certification, and it's no wonder. Organizations that are highly agile and responsive to market dynamics complete more of their projects successfully than their slower-moving counterparts — 75 percent versus 56 percent — as shown in our 2015 Pulse of the Profession® report.

The PMI-ACP spans many approaches to agile such as Scrum, Kanban, Lean, extreme programming (XP) and test-driven development (TDD.) So it will increase your versatility, wherever your projects may take you.

Apply for PMI-ACP Certification

Register and log in to get started

Important ACP Updates

The updated PMI-ACP® exam launched on 26 March.

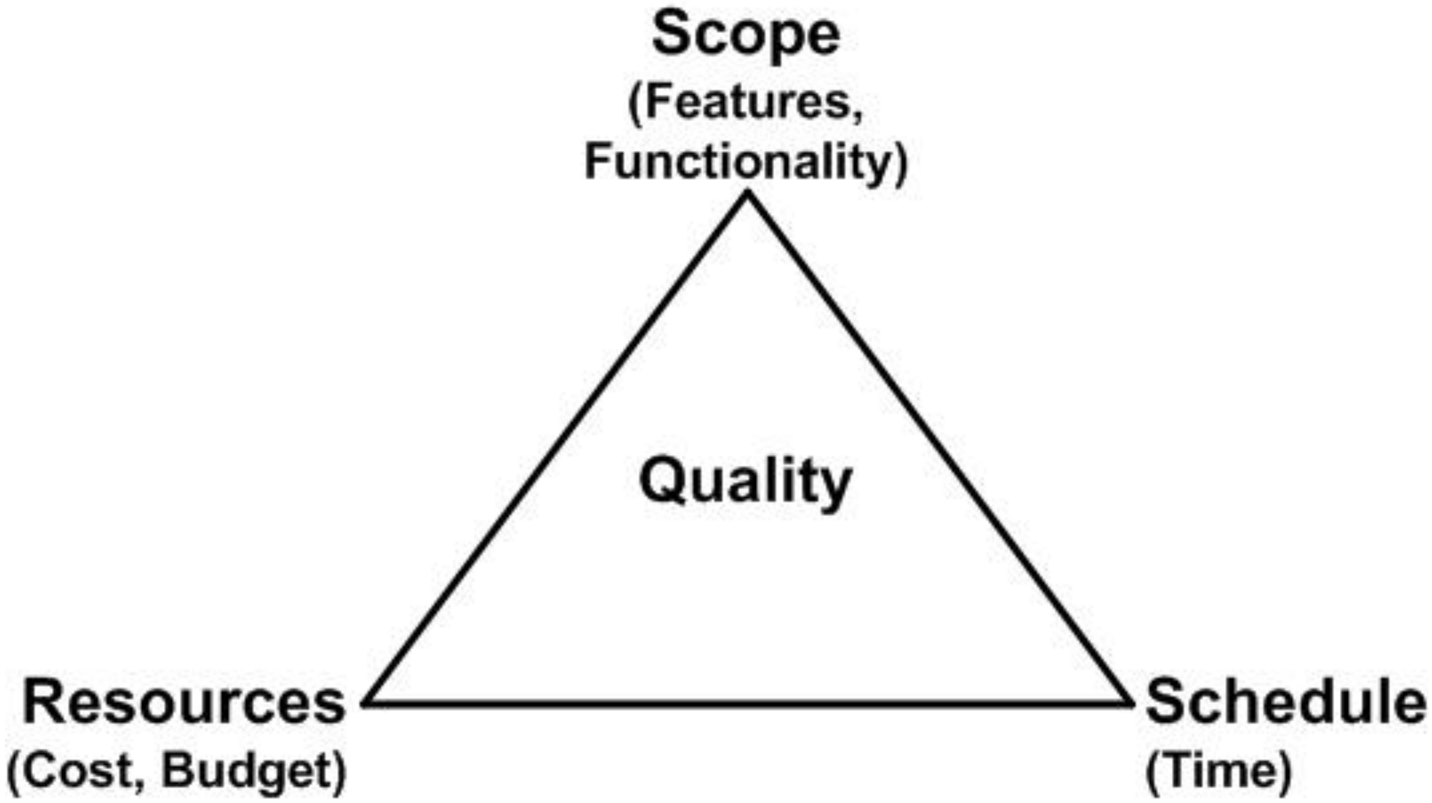
PMI-ACP® exam is now available in five new languages.

PMI-ACP Exam Guidance

Review tips, resources and FAQs to help you prepare. Resources are now available in five new languages.

Prepare for the exam

The Iron Triangle



Copyright 2003-2006 Scott W. Ambler

Controlling Software Projects

- Four control variables require balancing
  - Resources
  - Time
  - Scope
  - Quality
- It is not advisable to set a priori the value of all variables simultaneously, if we want a successful project.
- "*scope*" is often the most important variable to control

The Resource Variable

- Staffing is usually the **least effective** variable to adjust.
  - Staffing increases have long lead times.
  - Increased intensity has diminishing returns.
  - Team culture requires some degree of stability.
- Tools and technology can provide benefits.
  - Effective tools provide continuing benefits.
  - Front-end costs need to be carefully amortized.
  - The wrong tools and technology increase friction.

The Time Variable

- Can be the **most painful** variable to adjust
  - Early commitments are usually date-based.
  - Target dates are often the most important objective.
  - Within a date boundary, there's only so much time.

The Scope Variable

- Can be the **most effective** variable to adjust
  - Can adjust scope breadth – what's included.
  - Can adjust scope depth – refinement.
  - Partial scope can often generate immediate returns.
  - It is often preferable to reach a date with partial scope completely finished, rather than complete scope partially finished.

Differences on Managing Agile Processes

- Iterative and incremental
- Parallel and concurrent, not phased
- Planned around deliverables, not activities
- Dynamic project balancing via scope adjustments
- Heavy emphasis on collaboration
- Management by facilitation

Iterative and Incremental

- Iterative
  - Repeatedly executing nested process cycles
  - Iterations provide synchronizing points
  - Iterations provide feedback points
- Incremental
  - System is built in progressive stages
  - Iterations add features and refinements
  - Increments are working systems

Paralell and Concurrent Activities

- Phased Approach
  - Gathers similar activity types together
  - Preference towards serial completion
  - Ultimate in phased approach is waterfall
- Concurrent and Parallel
  - Activities occur opportunistically
  - Activities of all types happening at the same time
  - Partial completion considered the norm

Predictive vs. Agile Planning

- Predictive Planning
  - Creation of comprehensive activity-based plans
  - Execution of defined activities to follow plan
  - Management by controlling activities to conform to plan
- Agile Planning
  - Creation of prioritized set of deliverables
  - Opportunistic execution of activities to create deliverables
  - Management via feedback and adaptation

Project Balance in an Agile Process

- Sustainable resource management
  - Stable teams
  - Steady pace
  - Favor high ROI tools and technology
- Fixed time management
  - Time-boxed development cycles
- Adaptive scope management
  - Feedback-based scope adjustments

“Heroic” vs. “Collaborative”

- Heroic development emphasizes individuals
  - Activities assigned to individuals
  - Project results heavily dependent on individual performance
  - Increases “keyhole” risks
- Collaborative development emphasizes teams
  - Teams self-organize activities to meet goals
  - Teams leverage diverse skills
  - Teams mitigate keyhole risks

Management by Facilitation

- Traditional “Command and Control Strategy”
  - Decisions made by central authorities
  - Activities delegated
  - Manager controls activities
- Replaced by “Facilitation and Empowerment Strategy”
  - Decisions made by those with the most info
  - Activities accepted
  - Team self-manages and adapts
  - Organization ensures supportive environment

Iteration 0

- To plan or not plan?
  - Some people think agile development gives developers license to dive in and build, spending little or no time on early requirements gathering or architectural issues.
  - Projects in which months and months of planning, requirements specification, and architectural philosophizing occur before they deliver any customer value are not positively evaluated.
  - Iteration 0 is a practice that can help teams find that middle ground and balance anticipation with adaptation.
- The meaning of "0"
  - Nothing useful to the customer—features, in other words—gets delivered in this time period.
  - However, the fact that we have designated an iteration implies that the work is useful to the project team: architecture work, technological training, requirements document to base a contract signing,

Iterations 1–N

- Iteration planning
  - assigns features to iterations for the duration of the project helps getting a feel for the project flow and determination of completion dates, staffing, costs, and other project planning information
- Activities of iteration planning
  - Determining how identified risks will influence iteration planning
  - Identifying the schedule target
  - Establishing the milestone and iteration periods
  - Developing a theme for each iteration (or milestone)
  - Assigning feature cards to each iteration, balancing customer priorities, risks, resources, and dependencies as necessary
  - Summarizing the plan in some combination of a feature-level spreadsheet plan, a feature card layout (usually on a wall), or a project parking lot
  - Calculating an initial project schedule from staff availability and total feature effort estimates
  - Adjusting the completed plan as necessary
- Increasing schedule reliability
  - +10% assigned to a “Rework and contingency” feature card
  - 1 or more “empty” iterations at the end of the project

Three Types of Iteration Plans

- Complete
  - A complete plan with features assigned to every iteration.
- Two-iteration plan
  - A two-iteration plan utilizing only a next iteration and then everything after
- One iteration
  - An iteration-by-iteration plan

- Best type of plan?
  - Depends on the nature of the project and the expectations of customers and stakeholders.
  - High exploration-factor projects suggest "one-iteration" plan that selects features for the first iteration, and continue only with a vague idea of the rest of the project.

Next Iteration Plan

- Activities
  - To construct the list of activities to implement each feature, recording it on the back of the card.
- Reestimation
  - The team reestimates the work effort based on the more detailed assessment and adjusts the features planned for the iteration if necessary.
- Assignment
  - Team members sign up for features or activities based on their skills and/or desires.
  - Taking on the responsibility for getting the work done reinforces each individual's commitment to the project and thereby contributes to building a self-organizing team.

Estimation

- How to estimate the unknown?
  - You can't!
  - When there are unknowns, you are guessing, not estimating.
  - Time and cost are often viewed as constraints, not estimates, in agile projects.
  - Agile organizations learn to live with uncertainty rather than trying to demand certainty in a fast-changing world.
- How to estimate by features rather than activity?
  - Estimate requirements gathering on a feature-by-feature basis, instead of for the overall project
- How to do progressive estimation?
  - Bottom up and top down, comparisons to similar projects, and using estimating tools, can help teams arrive at better overall project estimates, but they can't make up for uncertainty.
  - Multiple techniques can provide a better estimate for the entire project.
  - Team member estimates should be used for the next iteration plan.

Scope Evolution

- Reality is more complex than an admonition to "avoid scope creep" can handle
- Some scope changes are inexpensive but valuable.
- Some scope changes are extensive and expensive but crucial to delivering customer value
- In general, scope changes incorporated to meet evolving customer requirements and undertaken with an understanding, and approval, of their impact on the project increase the probability of project success.
- Agile development encourages change that arises from evolving knowledge, while at the same time it discourages the gold plating and requirements bloat that often occur in traditional up-front requirements gathering.
- Agile development is about focus and balance—focusing on the project's key vision and goals and forcing hard tradeoff decisions that bring balance to the product.
- Agile development plans by feature, in customer terminology, thereby concentrating the planning process on something the customer can relate to and prioritize easily.
- Because plans are adjusted each iteration based on actual development experience, not someone's guesses or wishes, nice-to-have features are pushed into later iterations and are often eliminated completely.
- A product's scope should be driven by customer value, technical feasibility and cost, the impact on a product's adaptability, and critical business schedule needs. It should not be held hostage to a plan developed when our product and project knowledge was still in its infancy.

ademar.aguiar@fe.up.pt

U.PORTO
FEUP FACULDADE DE ENGENHARIA
UNIVERSIDADE DO PORTO