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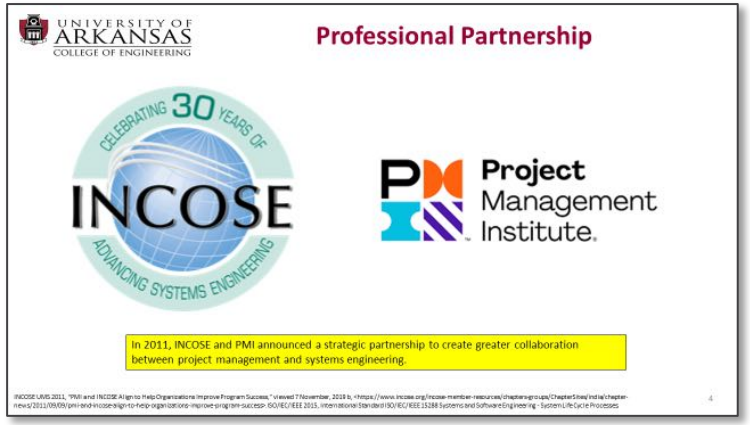
Eric Specking, Ph.D.
Gregory S. Parnell, Ph.D.
Edward Pohl, Ph.D.
System Design and Analytics Laboratory
Department of Industrial Engineering
University of Arkansas

Comparing INCOSE and PMI Portfolio Management Practices

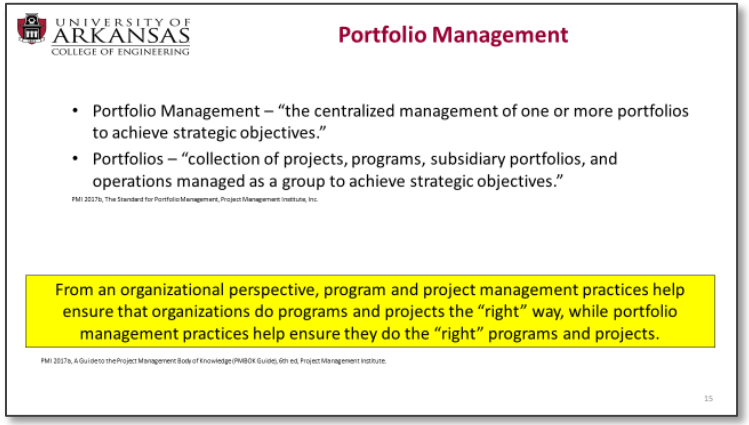
UNIVERSITY OF ARKANSAS | College of Engineering

Bottom Line Up Front

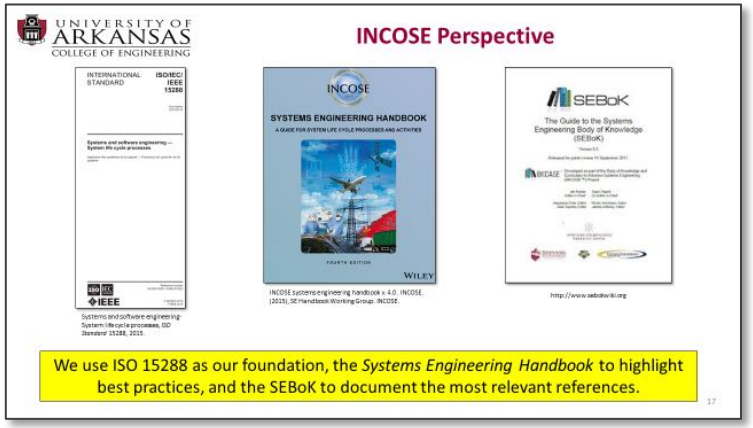
INCOSE/PMI Partnership



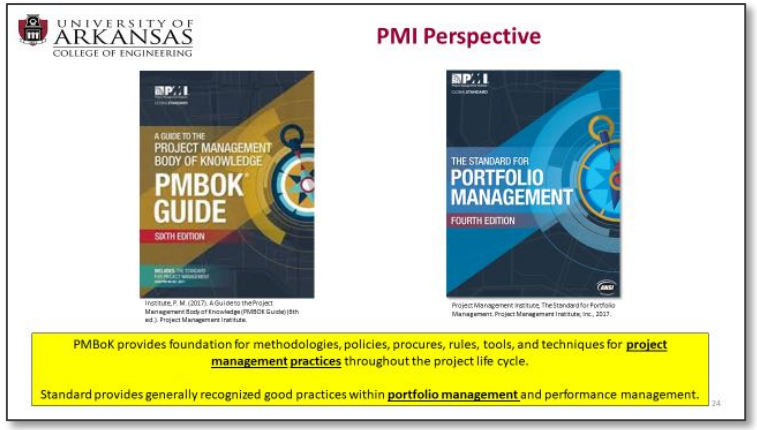
Portfolio Management



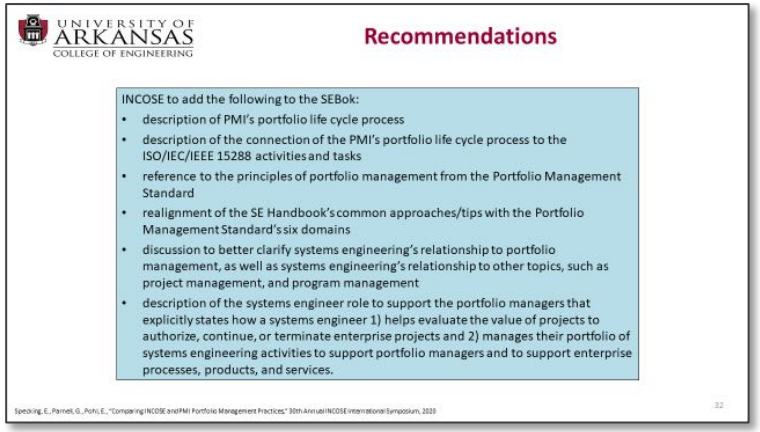
INCOSE Perspective



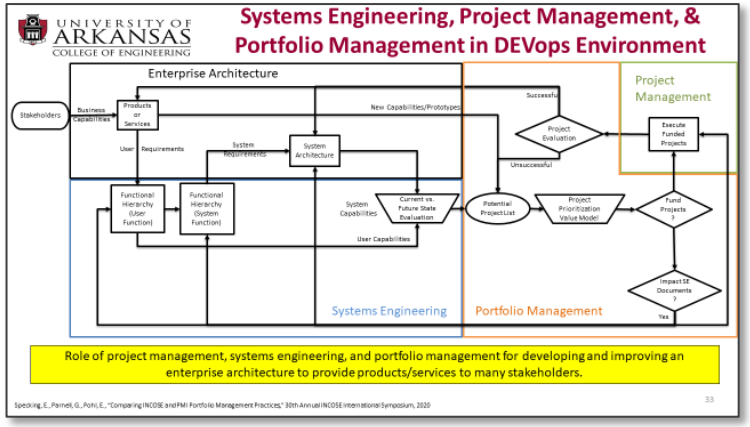
PMI Perspective



Results/Recommendations



Results/Recommendations



Overview

- ❑ INCOSE/PMI Partnership
- ❑ Partnership Response
- ❑ Overview of Portfolio Management
- ❑ INCOSE Perspective
- ❑ PMI Perspective
- ❑ Results and Recommendations

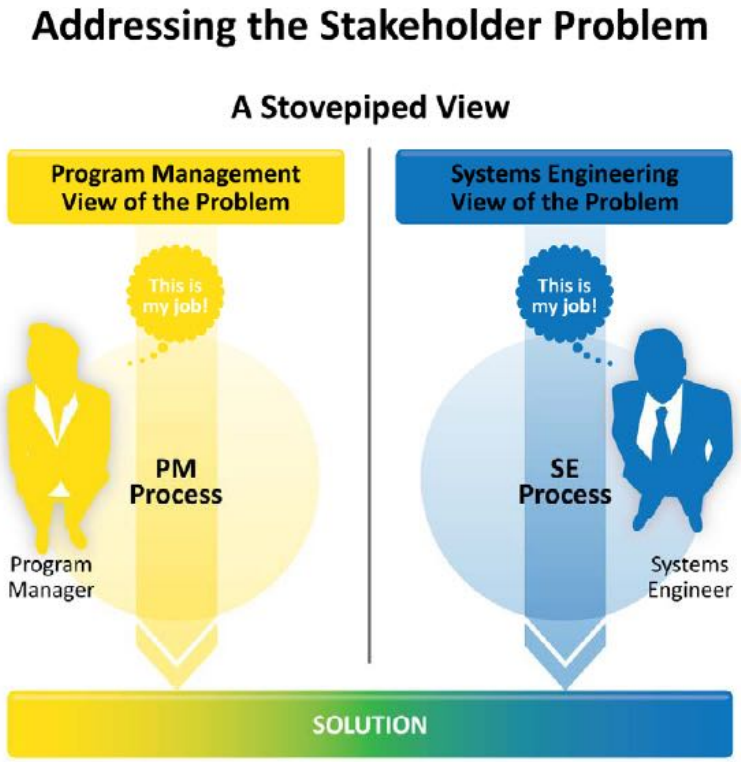
Professional Partnership

Project Management Institute

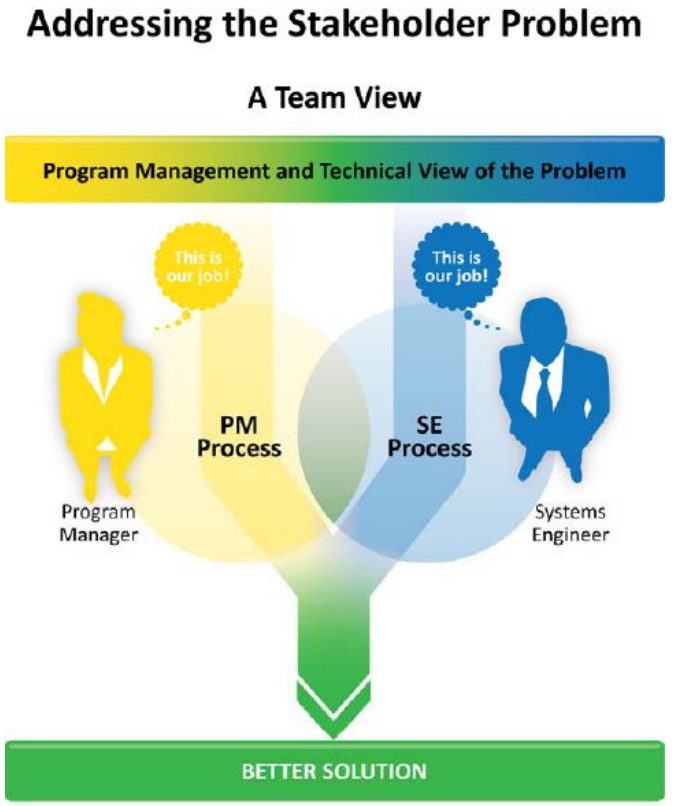
In 2011, INCOSE and PMI announced a strategic partnership to create greater collaboration between project management and systems engineering.

INCOSE UMS 2011, “PMI and INCOSE Align to Help Organizations Improve Program Success,” viewed 7 November, 2019 b, <https://www.incose.org/incose-member-resources/chapters-groups/ChapterSites/india/chapter-news/2011/09/09/pmi-and-incose-align-to-help-organizations-improve-program-success>.ISO/IEC/IEEE 2015, International Standard ISO/IEC/IEEE 15288 Systems and Software Engineering - System Life Cycle Processes.

Mindset Shift



"This new mindset recognizes that there cannot be two separate views of the stakeholder problem, but rather a single one that incorporates all elements of the program."



Organizations need to shift from an isolated to team view to solve stakeholder's problems.

Need a individuals to bring their unique perspectives and capabilities to the "shared space" where they can collaborate to drive success.

Langley, M., Robitaille, S., & Thomas, J. (2011). Toward a new mindset: bridging the gap between program management and systems engineering. Paper presented at PMI® Global Congress 2011—North America, Dallas, TX. Newtown Square, PA: Project Management Institute.

SE/PM Shared Space

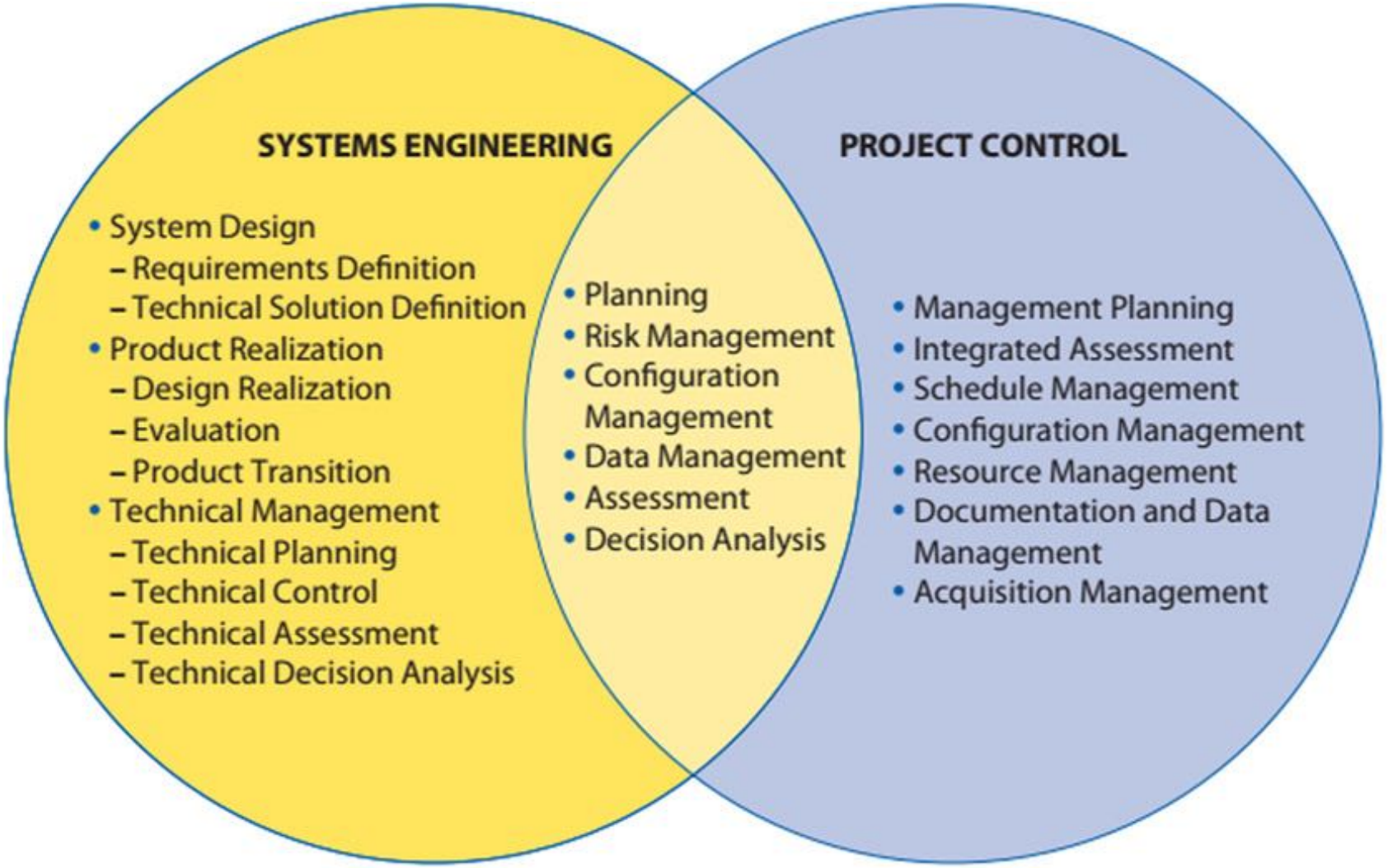
- Leadership
- Negotiation
- Communications
- Collaboration and teamwork
- Sustained focus on mission
- Risk management
- Configuration management

Langley, M., Robitaille, S., & Thomas, J. (2011). Toward a new mindset: bridging the gap between program management and systems engineering. Paper presented at PMI® Global Congress 2011—North America, Dallas, TX. Newtown Square, PA: Project Management Institute.

https://appel.nasa.gov/2010/10/23/aa_3-10_f_brief_pmse-html/

This list provides some insight into the shared capabilities, but is not collectively exhaustive.

SE/PM Shared Spaces



This process list provides some insight into the shared capabilities, but is not collectively exhaustive.

"Managing development projects—The partnership between project managers and systems engineers, " *Systems Engineering*, Sigal Kordova, Eyal Katz, Moti Frank , 18 November 2018

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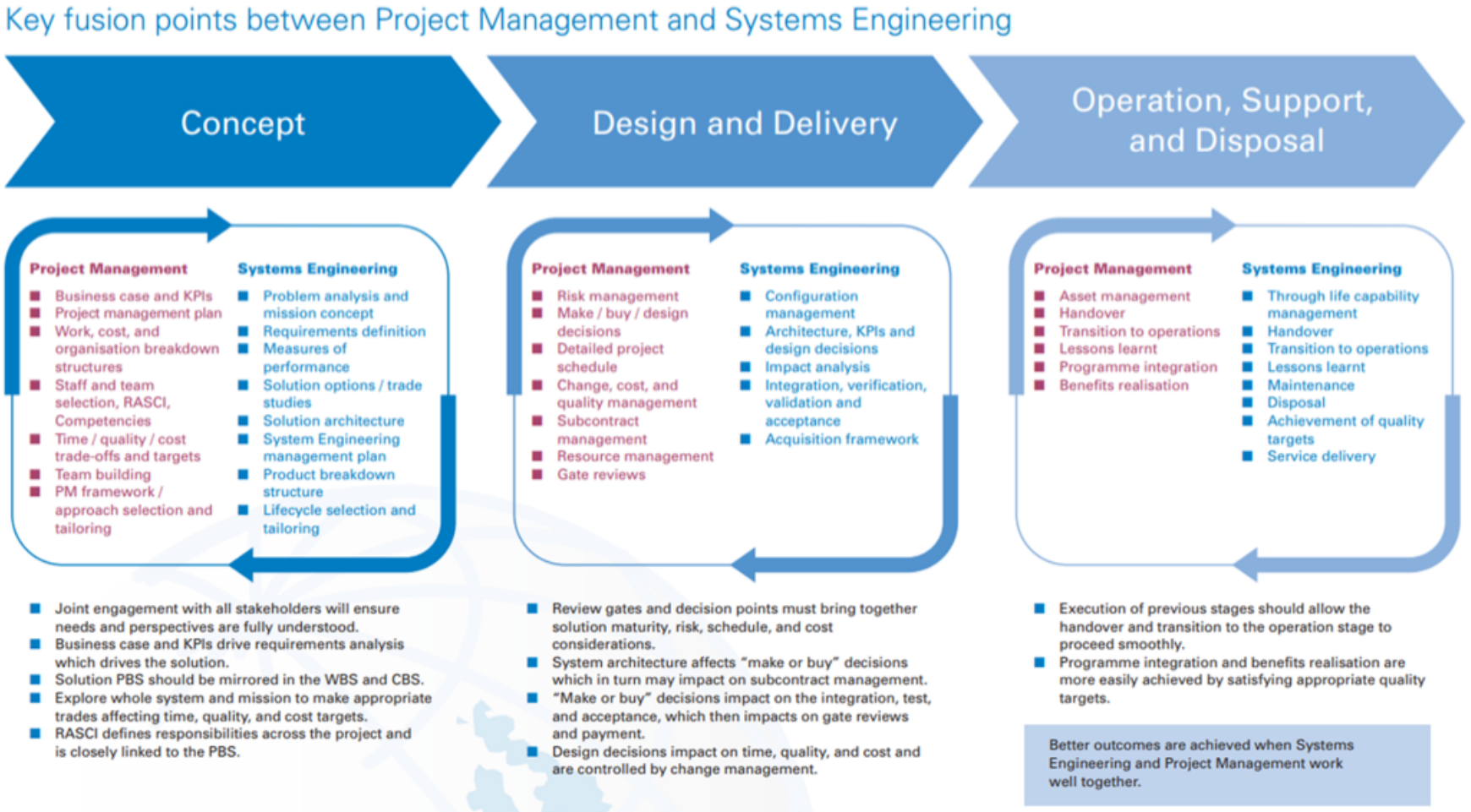
Engineering Education

M465·PMI/INCOSE Panel - The Project Management and Systems Engineering Education Imperative (June 11, 2012)

- Pat Hale (MIT)
- Peter Jackson (Cornell University)
- Michael Dupe Pennotti (Stevens Institute Technology)
- Brian Gilchrist (university of Michigan)

Engineering curricula needs to include an understanding of the interactions between project management and systems engineering.

SE/PM Integration



Provides insight into the responsibility boundaries between SE and PM and a means to enable conversations for integration.

Presents SE as being constrained to technical aspects of projects.

INCOSEUK, "Project Management and Systems Engineering." ZGuides Z11 Issue 1.1; Jan 2018. https://incoseuk.org/Documents/zGuides/Z11_SE_PM_WEB.pdf

SE and Program Management Integration

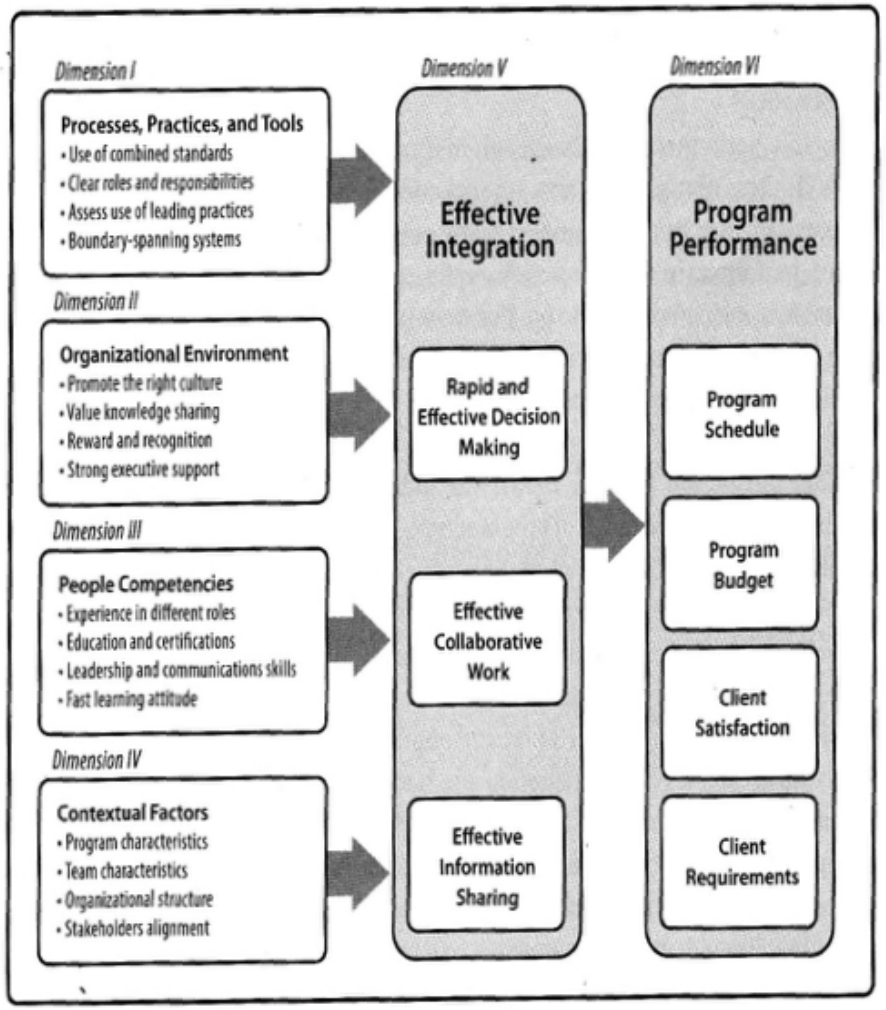
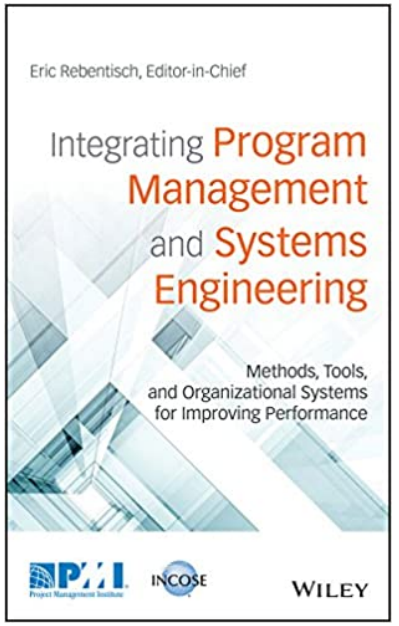


Figure 6-8: The complete Integration Framework with all dimensions and key elements

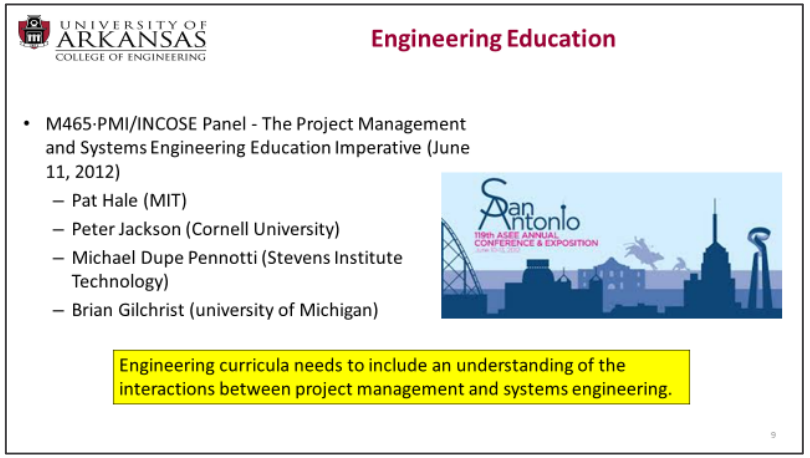


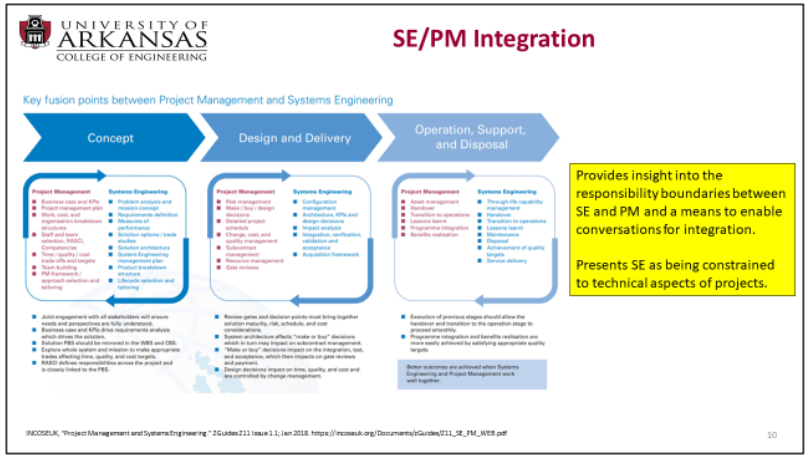
INCOSE PM-SE Integration Working Group collaborated with PMI and MIT to publish a book on integrating program management and systems engineering. The book provides:

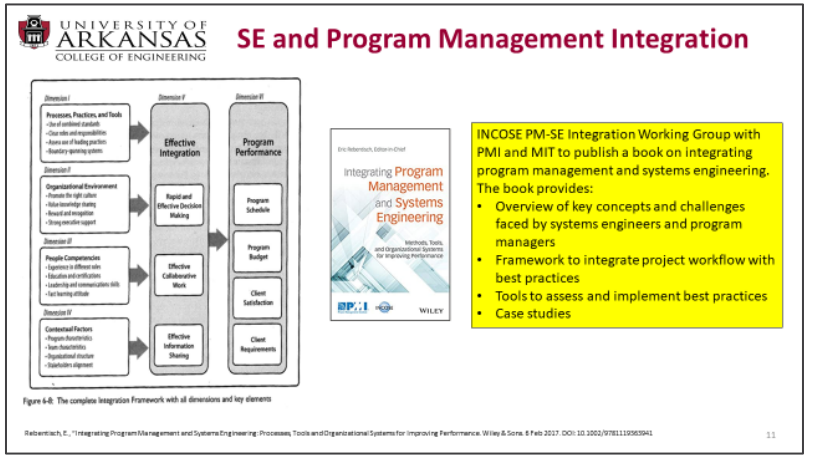
- Overview of key concepts and challenges faced by systems engineers and program managers
- Framework to integrate project workflow with best practices
- Tools to assess and implement best practices
- Case studies

Rebentisch, E., "Integrating Program Management and Systems Engineering: Processes, Tools and Organizational Systems for Improving Performance. Wiley & Sons. 6 Feb 2017. DOI: 10.1002/9781119363941

What's missing?







These works focus on project/program management integration with systems engineering.

What about portfolio management?

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Portfolio Management

- Portfolio Management – “the centralized management of one or more portfolios to achieve strategic objectives.”
- Portfolios – “collection of projects, programs, subsidiary portfolios, and operations managed as a group to achieve strategic objectives.”

PMI 2017b, The Standard for Portfolio Management, Project Management Institute, Inc.

From an organizational perspective, program and project management practices help ensure that organizations do programs and projects the “right” way, while portfolio management practices help ensure they do the “right” programs and projects.

PMI 2017a, A Guide to the Project Management Body of Knowledge (PMBOK Guide), 6th ed, Project Management Institute.

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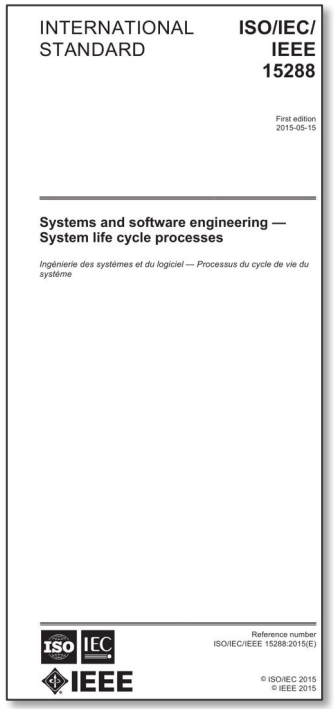
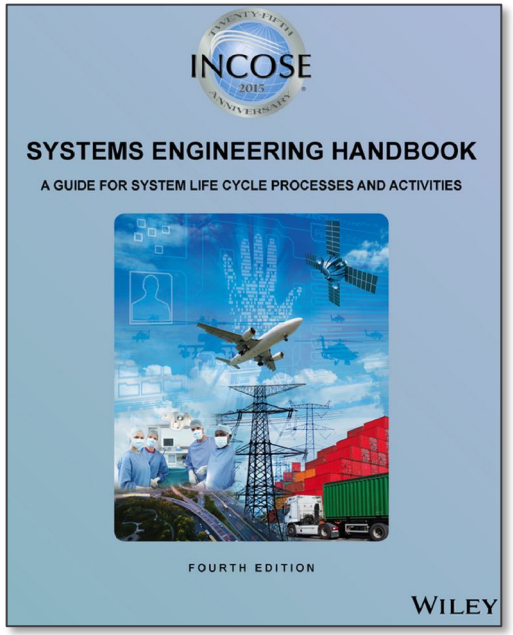
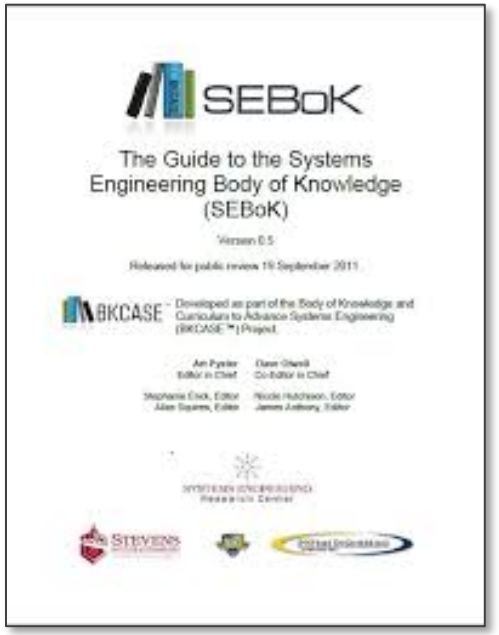
INCOSE Perspective



Systems and software engineering- System life cycle processes, *ISO Standard* 15288, 2015.



INCOSE systems engineering handbook v. 4.0 . INCOSE. (2015), SE Handbook Working Group. INCOSE.

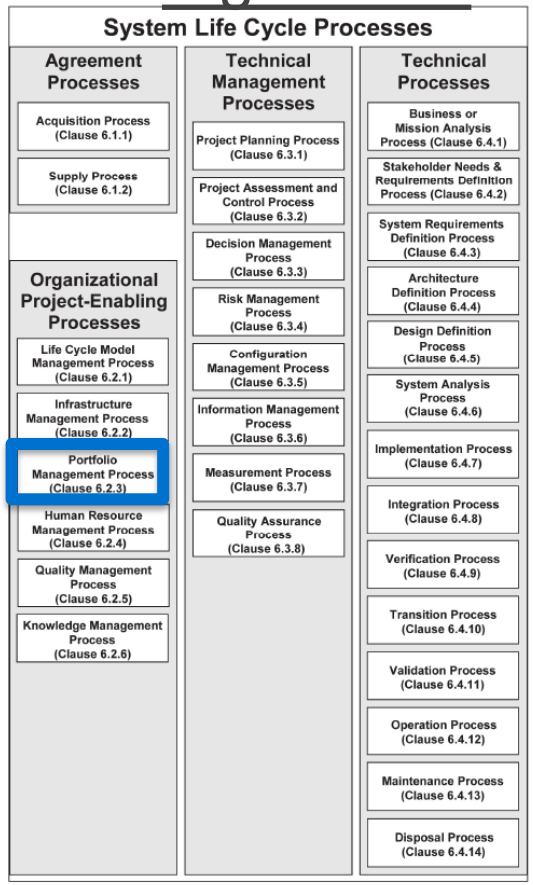


http://www.sebokwiki.org

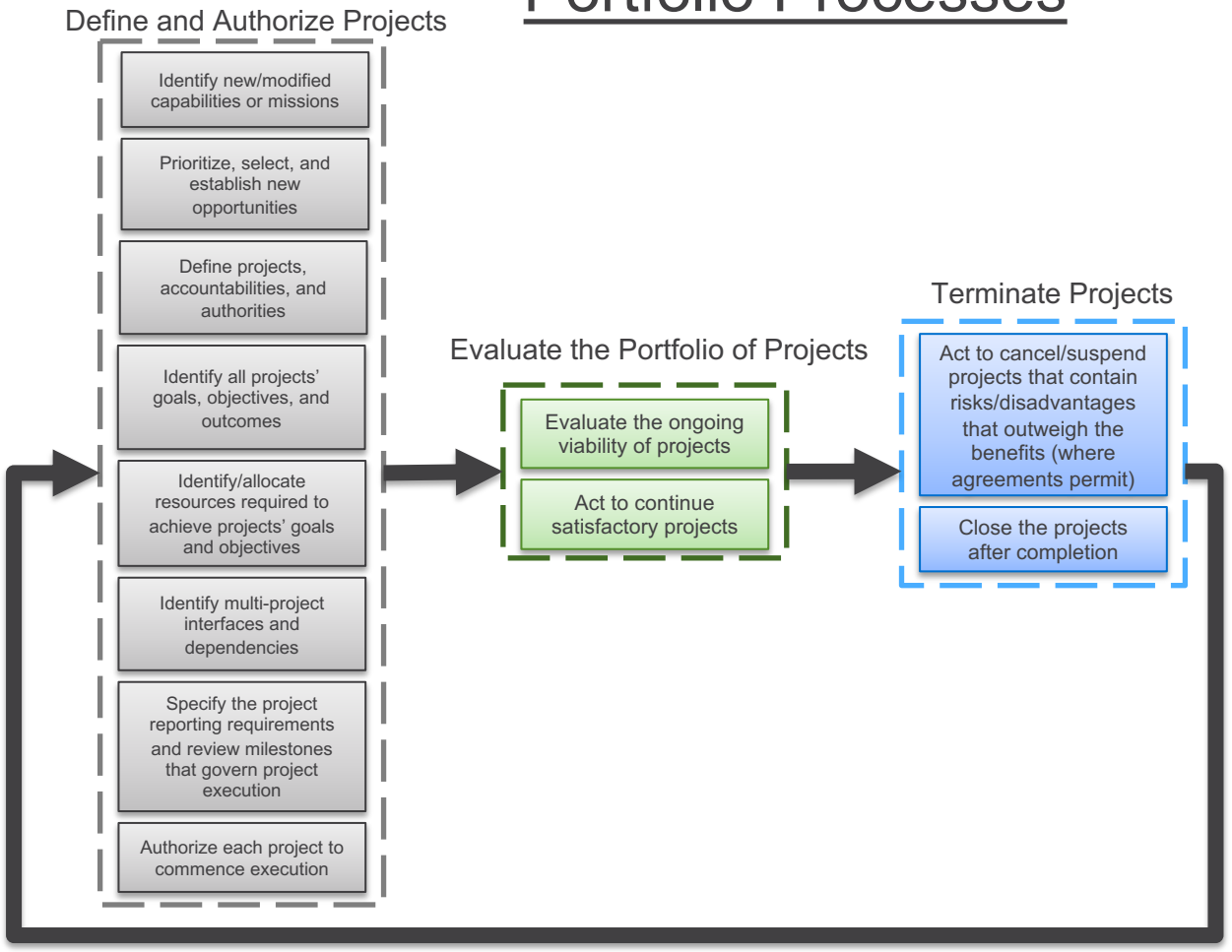
We use ISO 15288 as our foundation, the *Systems Engineering Handbook* to highlight best practices, and the SEBoK to document the most relevant references.

ISO/IEC/IEEE 15288

Big Picture

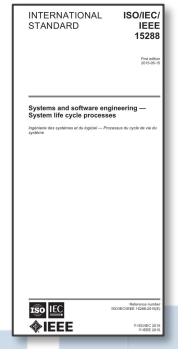


Portfolio Processes



Outputs

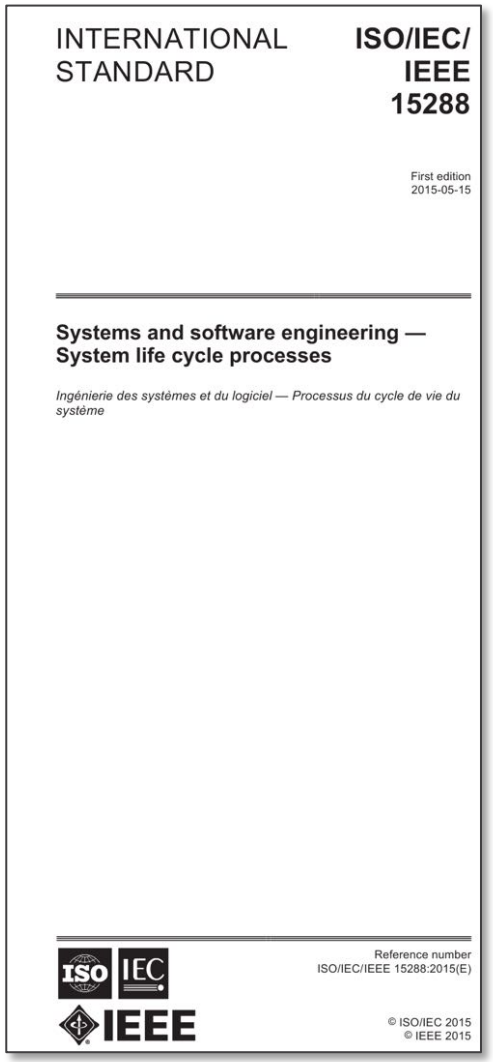
Organizational Project-Enabling Processes
Life Cycle Model Management Process
Life Cycle Policies, Processes
Life Cycle Procedures
Life Cycle Models
Process Assessment Results
Process Improvement Report
Infrastructure Management Process
Infrastructure Requirements
Infrastructure Elements
Infrastructure Change Requests
Portfolio Management Process
Portfolio Analysis Report
Project Initiation Report
Project Evaluation Report
Project Closure Report
Human Resource Management Process
Required Skills Report
Skills Inventory
Skill Development Assets
Skill Development Records
Qualified Personnel
Staff Assignment Records



Portfolio management contains 3 organizational project-enabling processes and 4 outputs.

International Standard ISO/IEC/IEEE 15288 Systems and Software Engineering - System Life Cycle Processes.

ISO/IEC/IEEE 15288 Portfolio Management Outcomes


INTERNATIONAL STANDARD

ISO/IEC/ IEEE 15288

First edition 2015-05-15

Systems and software engineering — System life cycle processes

Ingénierie des systèmes et du logiciel — Processus du cycle de vie du système

ISO IEC

IEEE

Reference number ISO/IEC/IEEE 15288:2015(E)

© ISO/IEC 2015
© IEEE 2015

Successful implementation of Portfolio Management leads to:

- qualification and prioritization of business venture opportunities, in-vestments, or necessities;
- identification of projects;
- allocation of project resources and budgets;
- description of project management responsibilities, accountability, and authorities;
- sustainment of project meeting agreement and stakeholder requirements;
- redirection or termination of unsatisfactory projects; and
- closure of successfully completed projects.

International Standard ISO/IEC/IEEE 15288 Systems and Software Engineering - System Life Cycle Processes. (2015).

SE Handbook

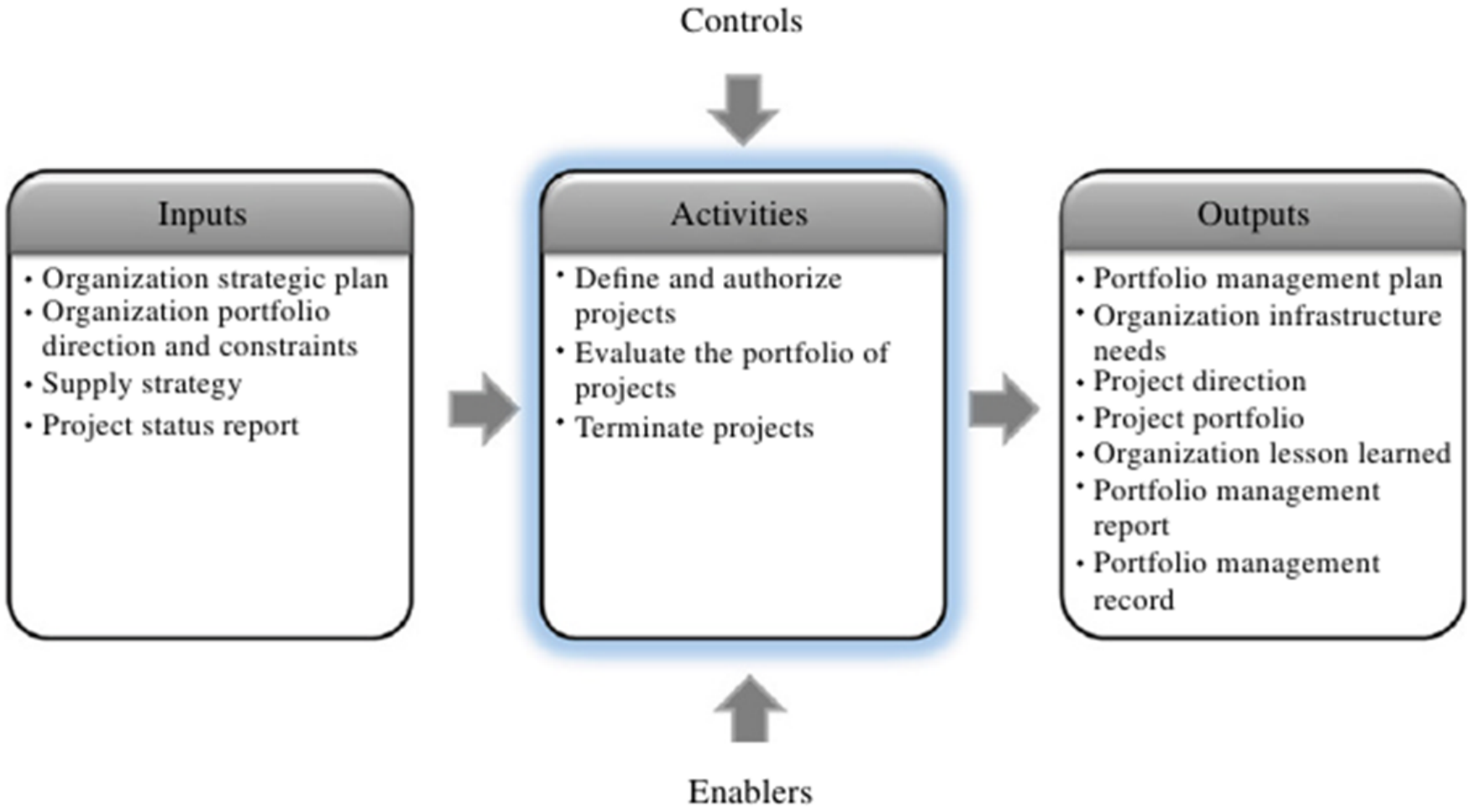
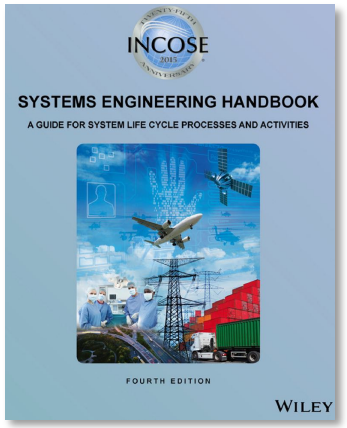


FIGURE 7.4 IPO diagram for the portfolio management process. INCOSE SEH original figure created by Shortell and Walden. Usage per the INCOSE Notices page. All other rights reserved.

Mentions portfolio management on 13 pages and provides detailed content on 4 pages.

Consistent with ISO/IEC/IEEE 15288

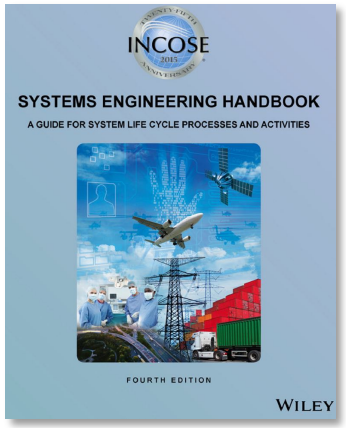


International Standard ISO/IEC/IEEE 15288 Systems and Software Engineering - System Life Cycle Processes. (2015).

SE Handbook
Portfolio Management
Common Approaches & Tips

Key Word	Description of Approach/Tip
Right Stakeholders	include relevant stakeholders when developing the organization's business area plan to enable the organization to determine present and future strategic objectives for focusing resources
Measurable Criteria	prioritize opportunities based upon measurable criteria that contains a stated threshold of acceptable performance
Progress Assessment	base expected project outcomes on defined, measurable criteria with specific investment assessment information to enable an impartial progress assessment;
Coordinate Interactions	use some type of coordination organization, such as a program office, to manage the interactions among active projects;
Consider Products and Systems	use a product line approach for scenarios where multiple customers need the same/similar system but customize the system as necessary;
Assess Risk	assess risk during current project evaluation and cancel/suspend projects with risks that outweigh the investment;
Align with Strategy	perform opportunity assessments of ongoing projects and avoid opportunities that contain unacceptable levels of risks, resource demands, or uncertainties or does not aligned with organization capabilities, strategic goals, or strategic objectives;
Allocate Resources	allocate resources based upon project requirements; and
Effective Governance	use effective governance processes, which support investment decision making and project management communications

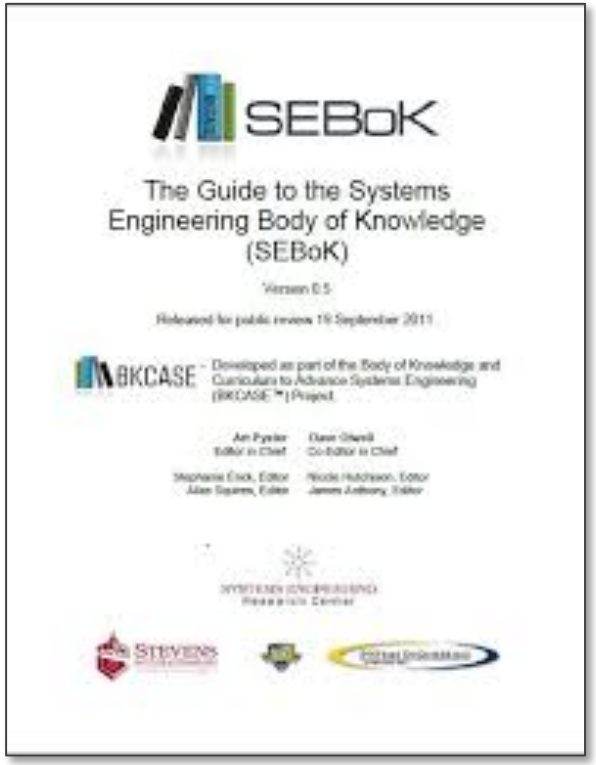
Common approaches and tips provide direction for best practices.



INCOSE. (2015). Systems Engineering Handbook: A Guide for System Life Cycle Processes and Activities (4th ed.). John Wiley & Sons, Inc.

SEBoK

- Enterprise systems engineering activity
  - 2 definitions
    - PMBoK (SEBok glossary)
    - Wikipedia (Portfolio Management subsection)
  - Insight into portfolio elements
- Resource Allocation and Budgeting activities



http://www.sebokwiki.org

Mentions portfolio management on 3 pages, has citations on 4 pages, and provides detailed content on 3 pages.

Does not contain the same information as ISO 15288 or SE Handbook.

Overview

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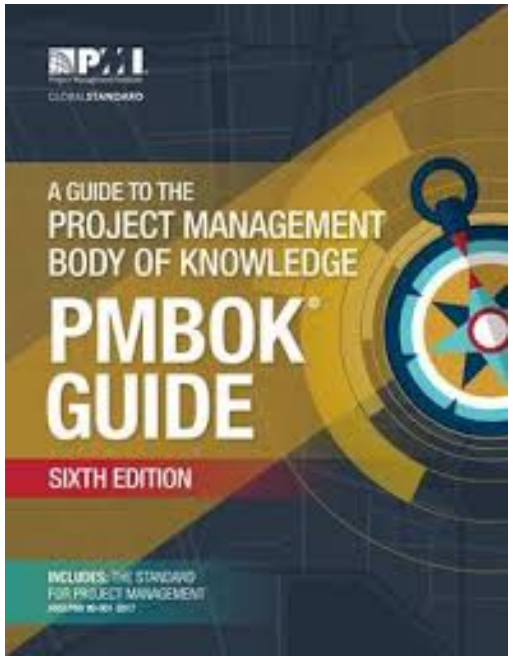
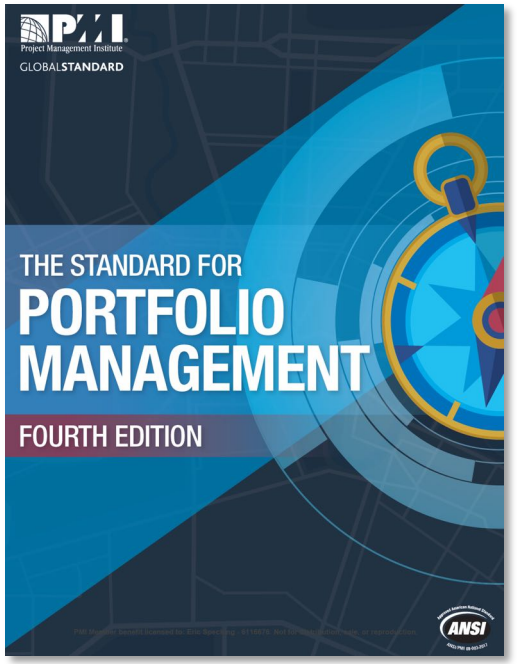
PMI Perspective



Institute, P. M. (2017). A Guide to the Project Management Body of Knowledge (PMBOK Guide) (6th ed.). Project Management Institute.

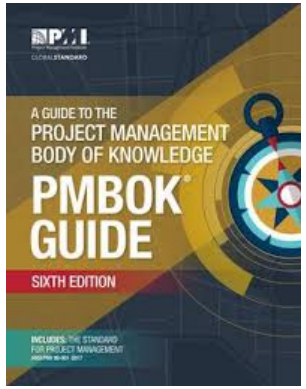


Project Management Institute, The Standard for Portfolio Management. Project Management Institute, Inc., 2017.

PMBoK provides foundation for methodologies, policies, procures, rules, tools, and techniques for **project management practices** throughout the project life cycle.

Standard provides generally recognized good practices within **portfolio management** and performance management.

PMBoK



Mentions portfolio management on 23 pages and provides detailed content on 2 pages.

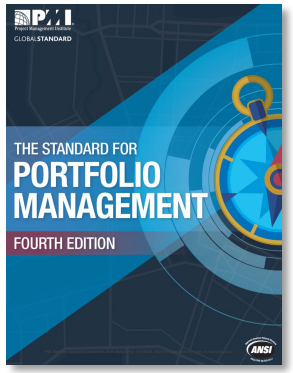
Addresses portfolios based upon their interactions with projects.

Recommends *The Standard for Portfolio Management* for portfolio management.

Organizational Project Management			
	Projects	**Programs**	**Portfolios**
Definition	A project is a temporary endeavor undertaken to create a unique product, service, or result.	A program is a group of related projects, subsidiary 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, subsidiary portfolios, and operations managed as a group to achieve strategic objectives.
Scope	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.
Change	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.
Planning	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.
Management	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.
Monitoring	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.
Success	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.

Institute, P. M. (2017). A Guide to the Project Management Body of Knowledge (PMBOK Guide) (6th ed.). Project Management Institute.

Standard for Portfolio Management



Captures:

- definition of portfolio management
- principles of portfolio management
- portfolio management's relationship to other topics (e.g., organizational strategy, strategic business execution, organization management, and project management)
- relationship between port-folio, program, project, and operations
- the role of the portfolio manager and other relevant portfolio management roles
- the portfolio life cycle
- portfolio strategic management
- portfolio governance
- portfolio capacity and capability management
- portfolio stakeholder engagement
- portfolio value management
- portfolio risk management

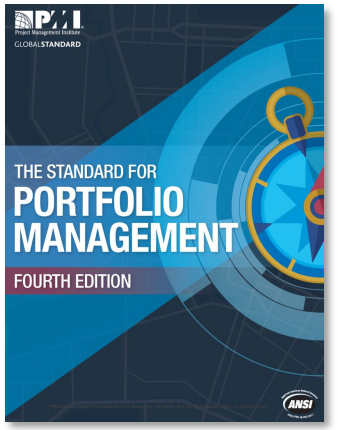
Provides detailed content on all 140 pages.

Project Management Institute, The Standard for Portfolio Management. Project Management Institute, Inc., 2017

Standard for Portfolio Management
Principles of Portfolio Management

Fundamental principles, which are core to this standard, include:

- "Strive to achieve excellence in strategic execution;
- Enhance transparency, responsibility, accountability, sustainability, and fairness;
- Balance portfolio value against overall risks;
- Ensure that investments in portfolio components are aligned with the organization's strategy;
- Obtain and maintain the sponsorship and engagement of senior management and key stakeholders;
- Exercise active and decisive leadership for the optimization of resource utilization;
- Foster a culture that embraces change and risk; and
- Navigate complexity to enable successful outcomes."



These principles provide guidance in the conceptualization, establishment, implementation, and ongoing management of portfolio(s).

Organizations can achieve greater organizational performance (value) by linking strategic planning and strategic business execution. This will also help improve resource usage, find new opportunities, and minimize risk.

Project Management Institute, The Standard for Portfolio Management. Project Management Institute, Inc., 2017.

Standard for Portfolio Management Performance Management Domains

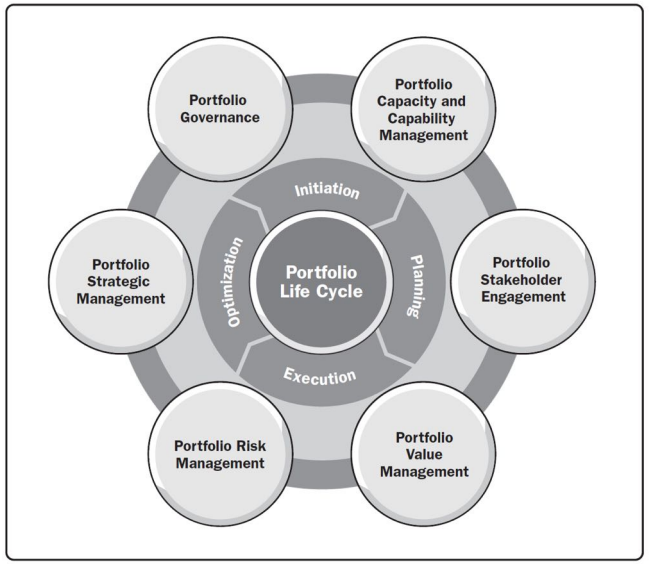
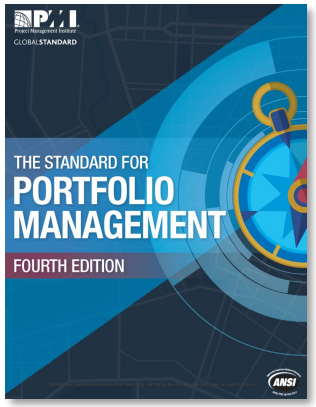


Figure 1-3. Portfolio Management Performance Domains



Domain	Description
Portfolio Strategic Management	Align portfolio components to one or more strategic objectives and monitor impact
Portfolio Governance	"Through open and transparent governance, including processes for categorizing, prioritizing, selecting, and approving portfolio components, key stakeholders are more likely to accept the decisions and agree with the process, even when they may not fully endorse the decisions made."
Portfolio Capacity and Capability Management	"The selection of portfolio components and the roadmap for their implementation is balanced against the organization's current capacity and capability with the potential of bringing in additional resources."
Portfolio Stakeholder Engagement	"Key portfolio stakeholders require active expectation management."
Portfolio Value management	uses the organizational strategy to enable investment in a portfolio with the expectation of a pre-determined return
Portfolio Risk Management	evaluates risks (positive/opportunities, negative/threats) and considers how those risks might impact accomplishing the portfolio strategic plan and objectives

PMI identifies 6 Portfolio Management Domains.

Project Management Institute, The Standard for Portfolio Management. Project Management Institute, Inc., 2017.

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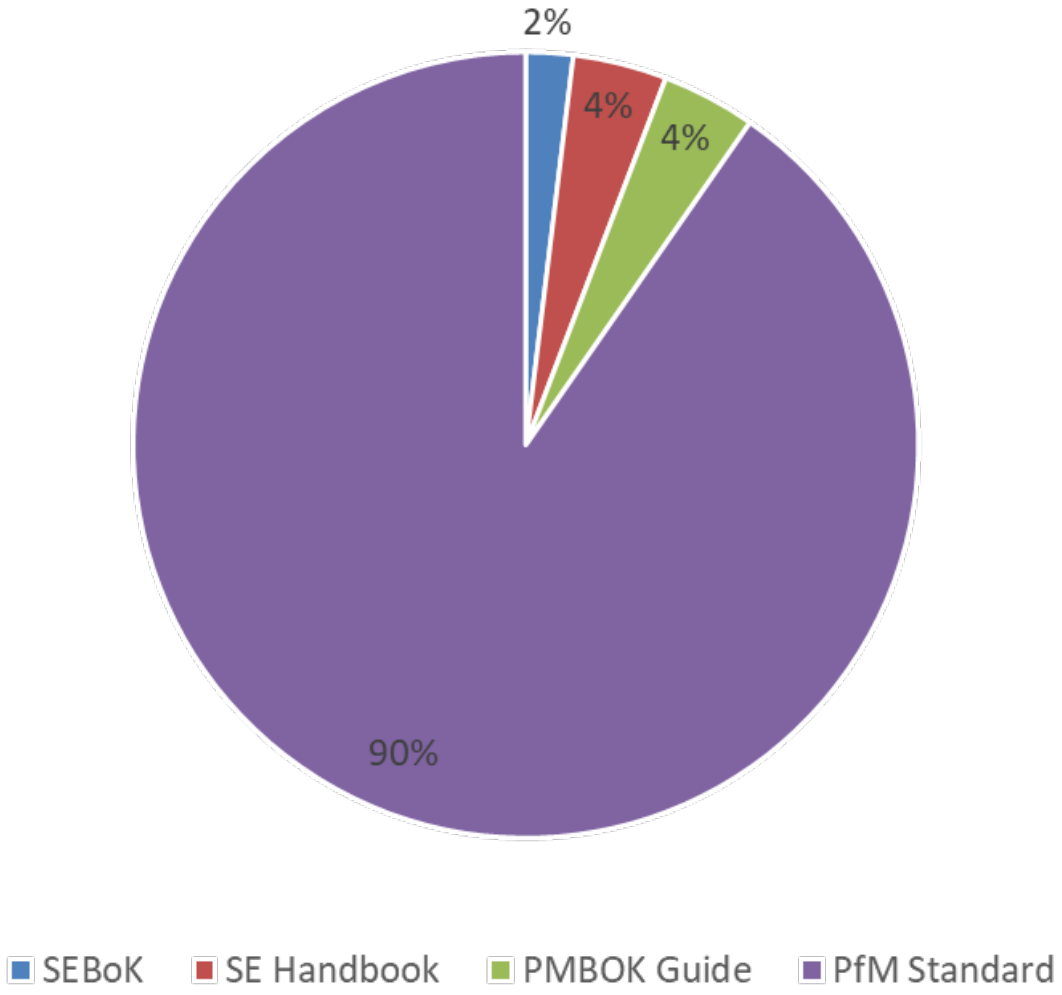
- ❑ Overview of Portfolio Management
- ❑ INCOSE Perspective
- ❑ PMI Perspective
- ❑ Results and Recommendations

Results

- Reviewed 2,484 pages from 4 references.
  - 55% of pages came from INCOSE references
- 155 (6.2%) contained information on portfolio management

Opportunity for SE organizations to enhance its portfolio management content by using best practices from PMI that are tailored to SE needs.



Specking, E., Parnell, G., Pohl, E., "Comparing INCOSE and PMI Portfolio Management Practices," 30th Annual INCOSE International Symposium, 2020

Key Ideas

Factor	Program/ Project Management	Portfolio Management
Key Idea	Manage programs/project “right”	Develop and select the “right” projects
Focus	Decentralized	Centralized
ISO/IEC/IEEE 15288 SE Processes	Define and Evaluate Projects SEs help PMs deliver value	Organizational project-enabling process
SE Handbook	SE support to PMs	Organizational project-enabling process 6 of 305 pages
SEBoK	SE support to PMs	Enterprise Portfolio Management 3 of 1063 pages
PMBOK Guide	SE support to PMs	Six goals of portfolio management 6 of 976 pages
Portfolio Management Standard		identify generally recognized good practices within the project portfolio management and performance management domains 140 of 140 pages

1. SEs help evaluate value of projects to authorize, continue, or terminate enterprise projects
2. SEs can manage their portfolio of SE activates to support PMs and SE activities to support enterprise processes.

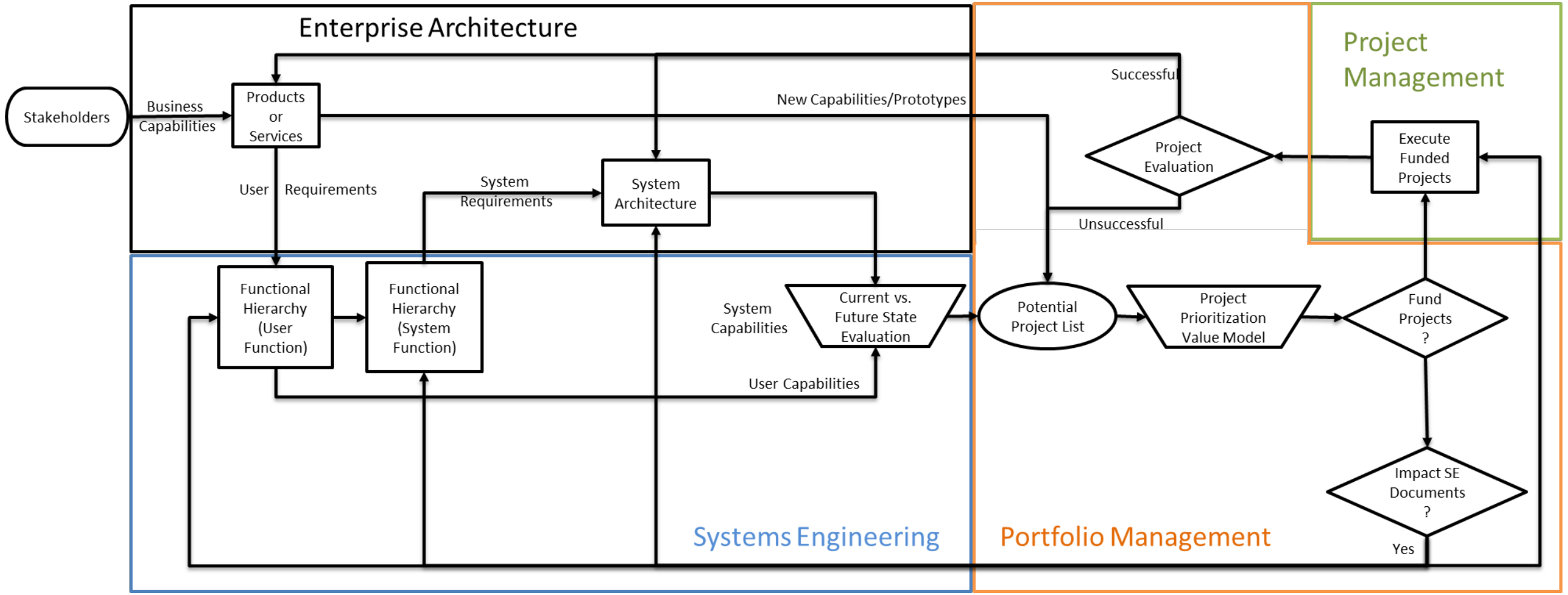
Specking, E., Parnell, G., Pohl, E., “Comparing INCOSE and PMI Portfolio Management Practices,” 30th Annual INCOSE International Symposium, 2020

Recommendations

INCOSE to add the following to the SEBok:

- description of PMI's portfolio life cycle process
- description of the connection of the PMI's portfolio life cycle process to the ISO/IEC/IEEE 15288 activities and tasks
- reference to the principles of portfolio management from the Portfolio Management Standard
- realignment of the SE Handbook's common approaches/tips with the Portfolio Management Standard's six domains
- discussion to better clarify systems engineering's relationship to portfolio management, as well as systems engineering's relationship to other topics, such as project management, and program management
- description of the systems engineer role to support the portfolio managers that explicitly states how a systems engineer 1) helps evaluate the value of projects to authorize, continue, or terminate enterprise projects and 2) manages their portfolio of systems engineering activities to support portfolio managers and to support enterprise processes, products, and services.

Systems Engineering, Project Management, & Portfolio Management in DEVops Environment



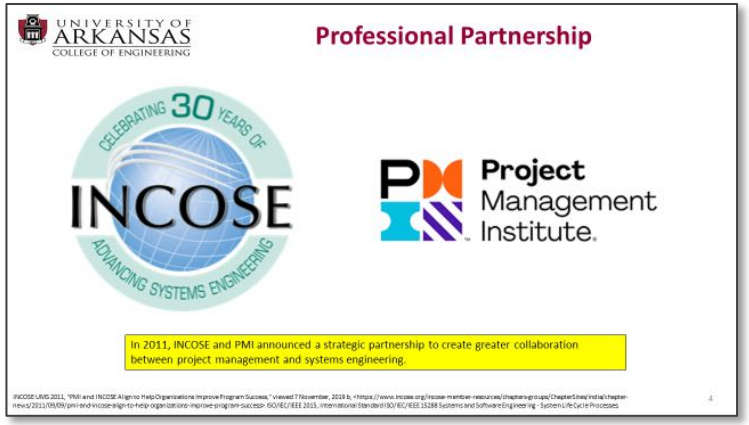
Role of project management, systems engineering, and portfolio management for developing and improving an enterprise architecture to provide products/services to many stakeholders.

Specking, E., Parnell, G., Pohl, E., "Comparing INCOSE and PMI Portfolio Management Practices," 30th Annual INCOSE International Symposium, 2020

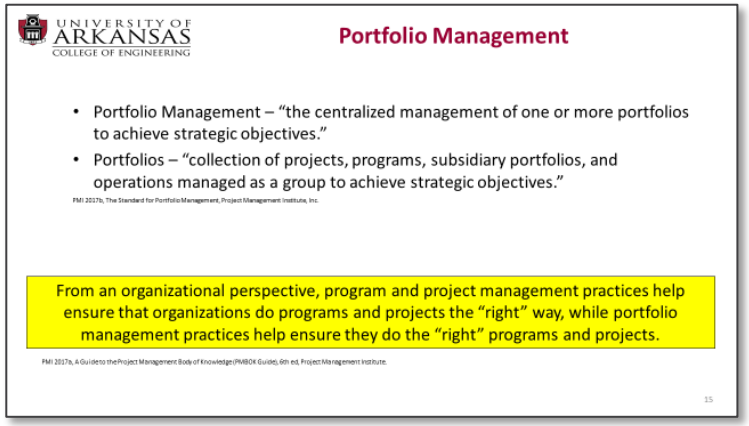
Summary

Eric Specking
479-575-7032
especki@uark.edu

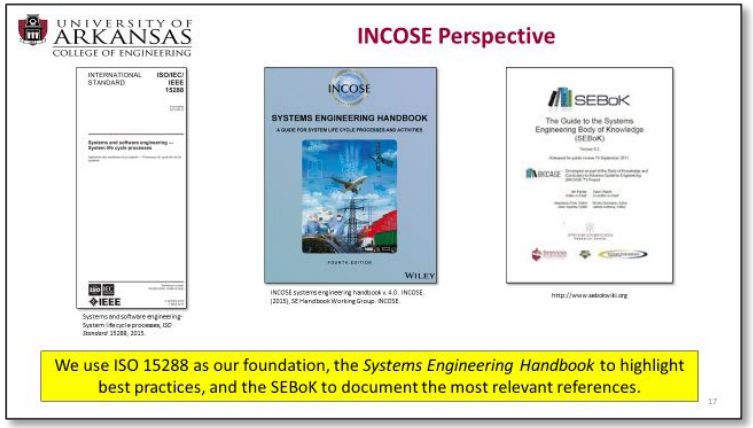
INCOSE/PMI Partnership



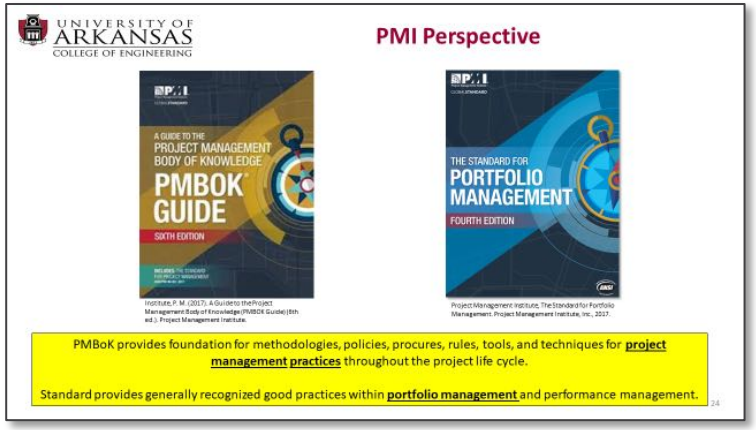
Portfolio Management



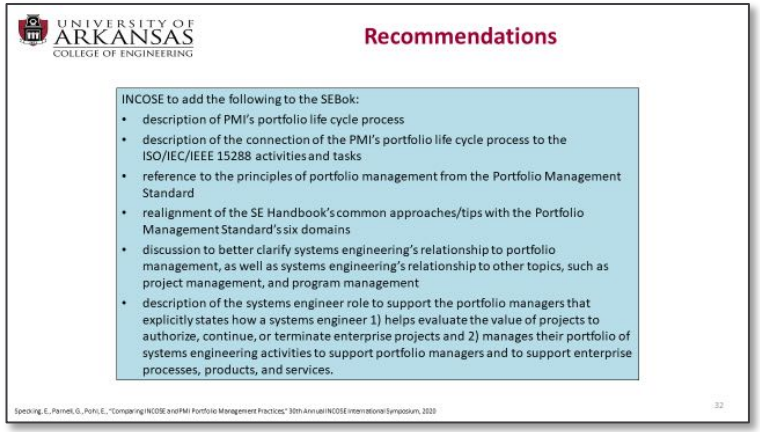
INCOSE Perspective



PMI Perspective



Results/Recommendations



Results/Recommendations