

 POLITECNICO DI MILANO

Dipartimento di
Elettronica e Informazione

Planning and Managing Software Projects 2010-11
Session 2

Overview of Project Management

Introduction, Fundamentals and Classic Mistakes

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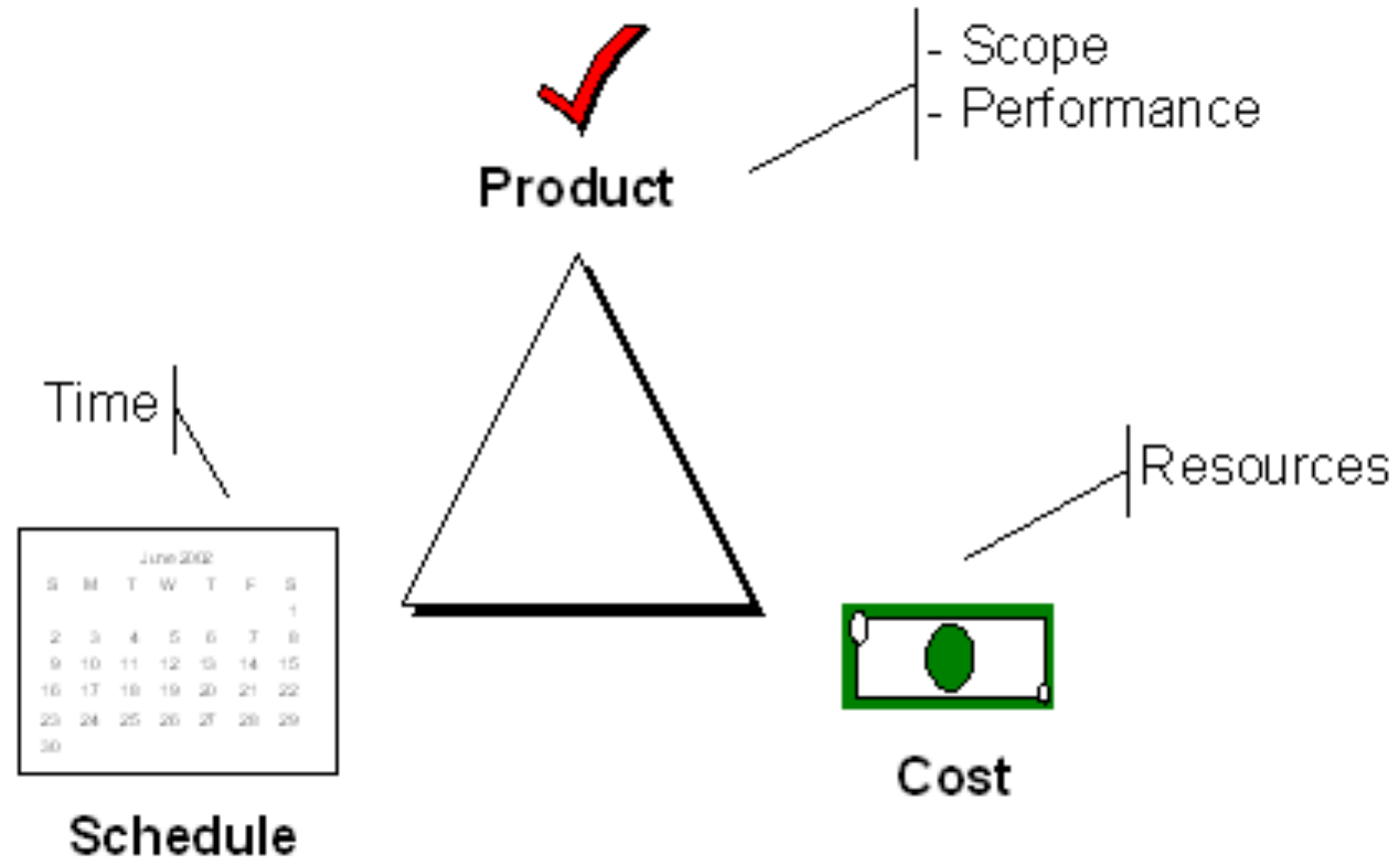
- This slides are largely based on Prof. John Musser class notes on “Principles of Software Project Management”
- Original slides are available at <http://www.projectreference.com/>
- Reuse and republish permission was granted

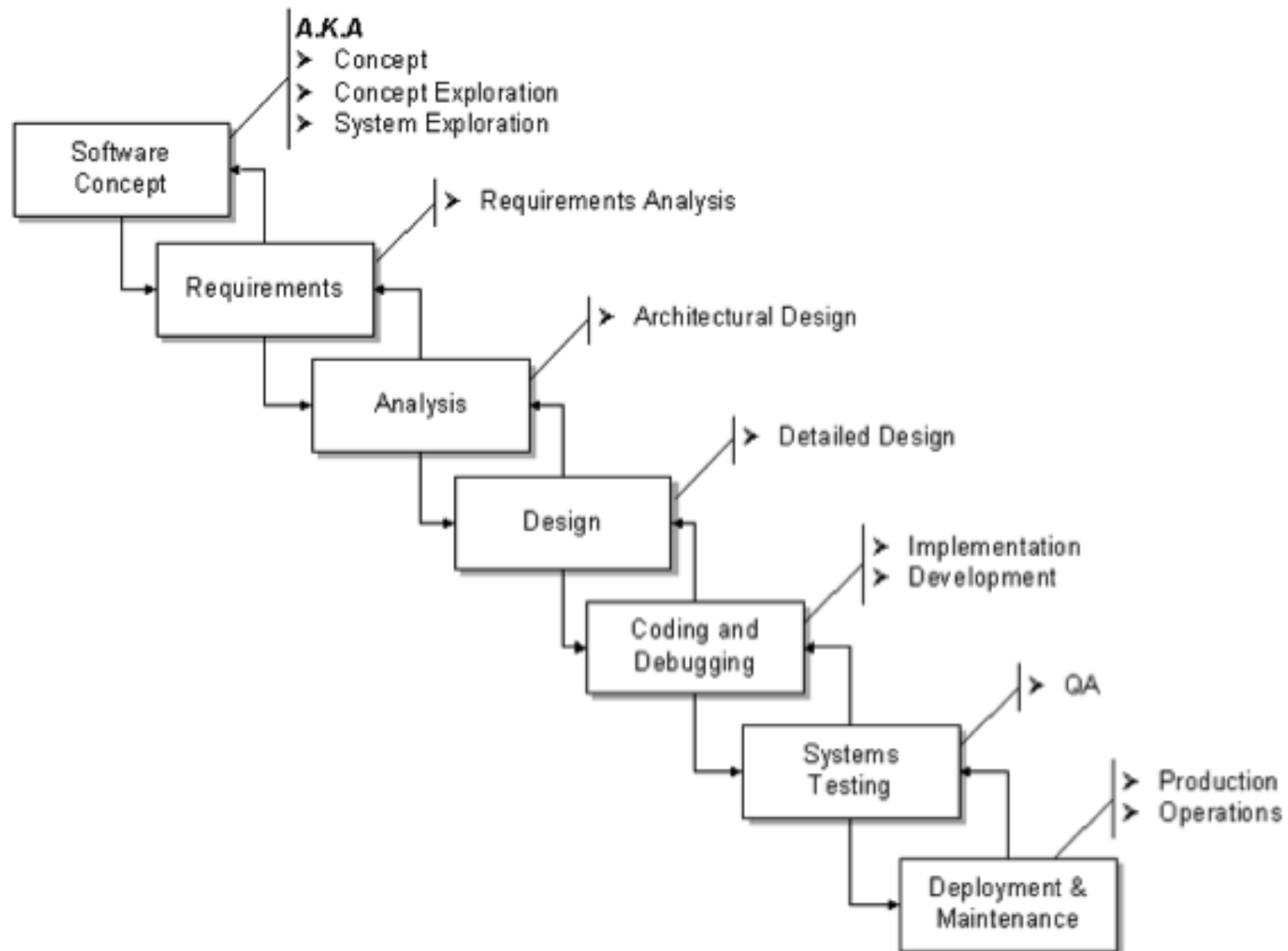
- PMI Fundamentals and Processes
- Project and Organizations
- Project Selection
- Project Portfolio Management
- Procurement Management
- Initial documents
 - Statement of Work (SOW)
 - Project Charter

- URL
 - <http://emanueledellavalle.org/Teaching/PMSP-2010-11.html>
- Schedule
 - Follows project phases
 - Optional Readings
 - Homework: 4 assignments
 - Homework 1 (**10 points**) due Class 3
 - Project Charter for your project
 - Homework 2 (**5 points**) due Class 5
 - Initial Work Breakdown Structure (WBS) for your project
 - Homework 3 (**3 points**) due Class 8
 - Top 10 Risk List for your project
 - Homework 4 (**13 points**) due Final Exam
 - Develop and submit a copy of the final project plan (include durations, resources, links, successors & predecessors) for your project

- Project and Program
- The field (more today and later)
- 4 Project Dimensions
 - People, process, product, technology
- Rapid Development Strategy
 - Avoid classic mistakes, development fundamentals, risk management, schedule-oriented practices
- Trade-off Triangle
- Process. One size not fit all.
- Phases (more today and next week)
- 36 Classic Mistakes

- Know which of these are fixed & variable for every project





- The 2001 Standish Group Report Showed Decided Improvement in IT Project Success Rates From the 1995
 - Time overruns: decreased to 63% compared to 222%
 - Cost overruns were down to 45% compared to 189%
 - Required features were up to 67% compared to 61%
 - 78,000 U.S. projects were successful vs. to 28,000
 - 28% of IT projects succeeded compared to 16%

- Why the Improvements?
 - Avg. cost reduced by half
 - Better tools for monitoring and control
 - More skilled PM' s, more process, more user involvement
 - And “The fact that there are processes is significant in itself.”

- How to identify a projects success potential
- What metrics could you look at?
 - Project size
 - Project duration
 - Project team size

- Executive support
- User involvement
- Experience project manager
- Clear business objectives
- Minimized scope
- Standard software infrastructure
- Firm basic requirements
- Formal methodology
- Reliable estimates

Standish Group “CHAOS 2001: A Recipe for Success”

Why Executive Support?

- Top management can help to:
 - Secure adequate resources
 - Get approval for unique project needs in a timely manner
 - Receive cooperation from people throughout the organization
 - Provide leadership guidance

Stakeholder Triad

1. Function Representative

- The ‘business person’
- Or SME: Subject Matter Expert

2. Executive Sponsor

- Project’s visionary & champion
- Also the ‘General’, ‘Fall Guy’ [1], and ‘Minesweeper’
- Not the PM, ‘Santa Claus’, or the ‘Tech Guy’

3. Project Manager

- The ‘Linchpin’ [2]
- Must be ‘multi-lingual’

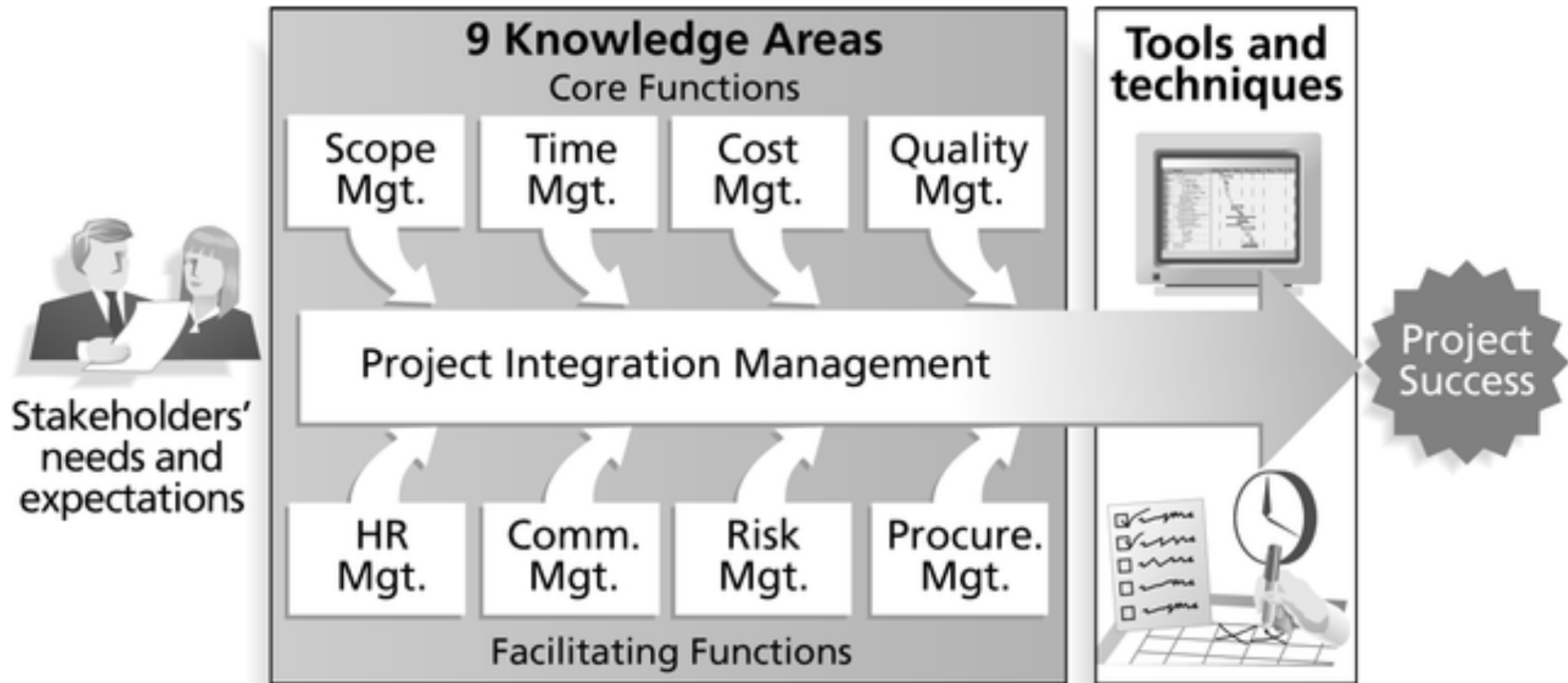
[1] http://en.wikipedia.org/wiki/Fall_guy

[2] <http://en.wikipedia.org/wiki/Linchpin>

- Define scope of project
- Identify stakeholders, decision-makers, and escalation procedures
- Develop detailed task list (work breakdown structures)
- Estimate time requirements
- Develop initial project management flow chart
- Identify required resources and budget
- Evaluate project requirements
- Identify and evaluate risks
- Prepare contingency plan
- Identify interdependencies
- Identify and track critical milestones
- Participate in project phase review
- Secure needed resources
- Manage the change control process
- Report project status

[source: Northwest Center for Emerging Technologies, "Building a Foundation for Tomorrow: Skills Standards for Information Technology," Bellevue, WA, 1999]

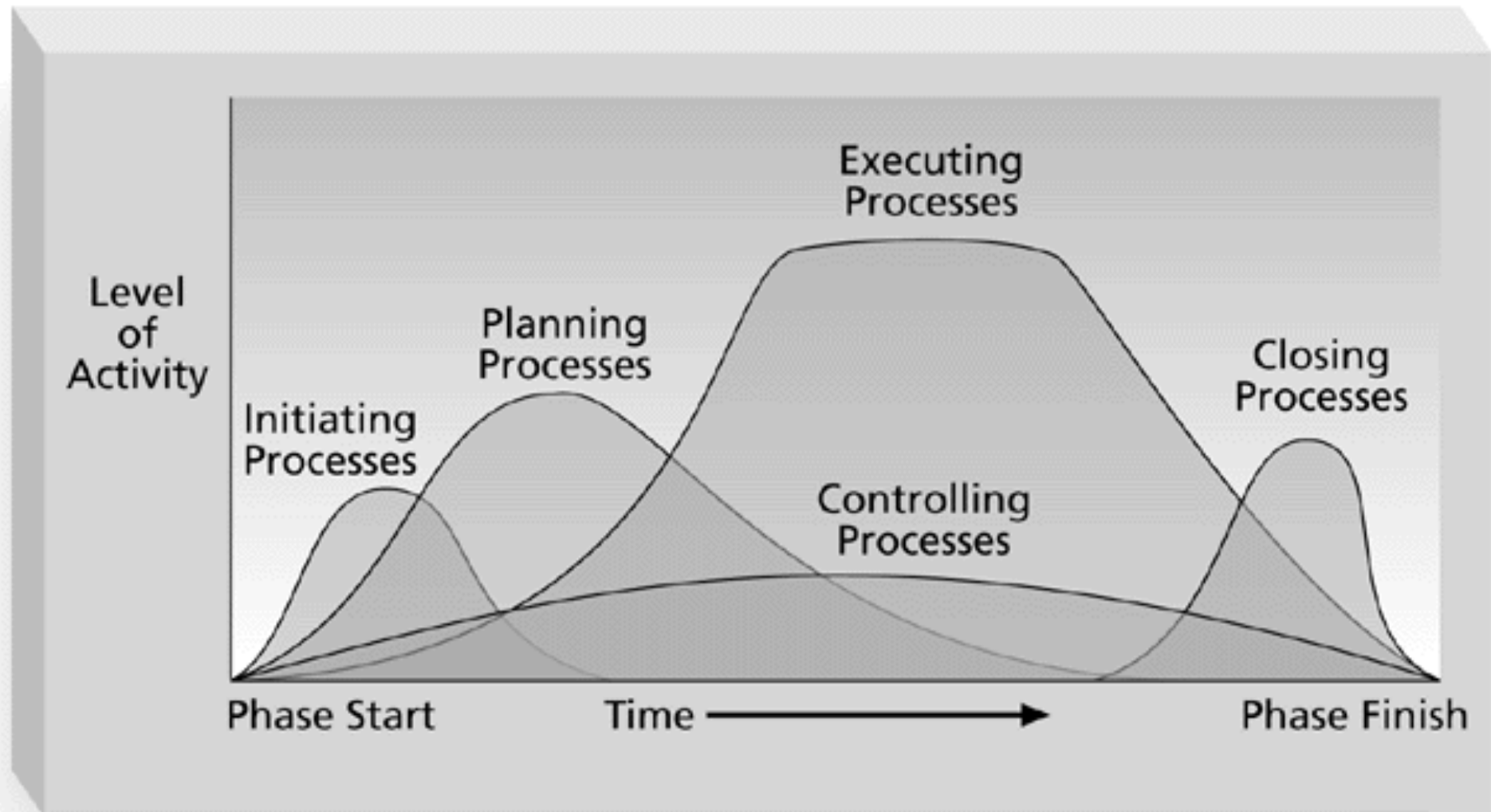
- Available on-line
<http://www.google.com/search?q=PMBOK.pdf>
- Structures PM by
 - A. Processes
 - B. Knowledge Areas
- Processes. 2 types
 1. PM processes: describing and organizing the work of the project
 2. Product-oriented processes: specifying and building the project's product

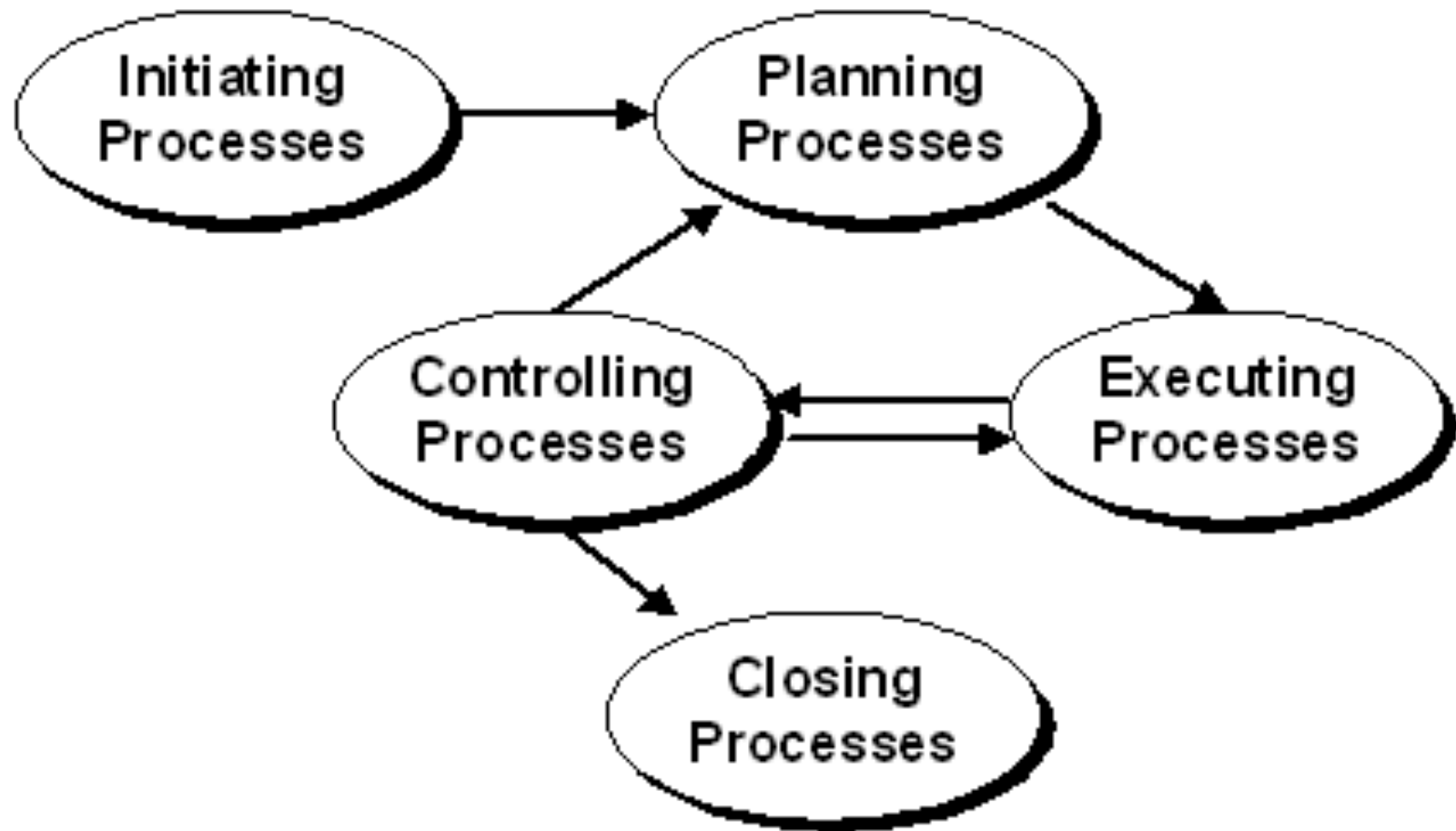


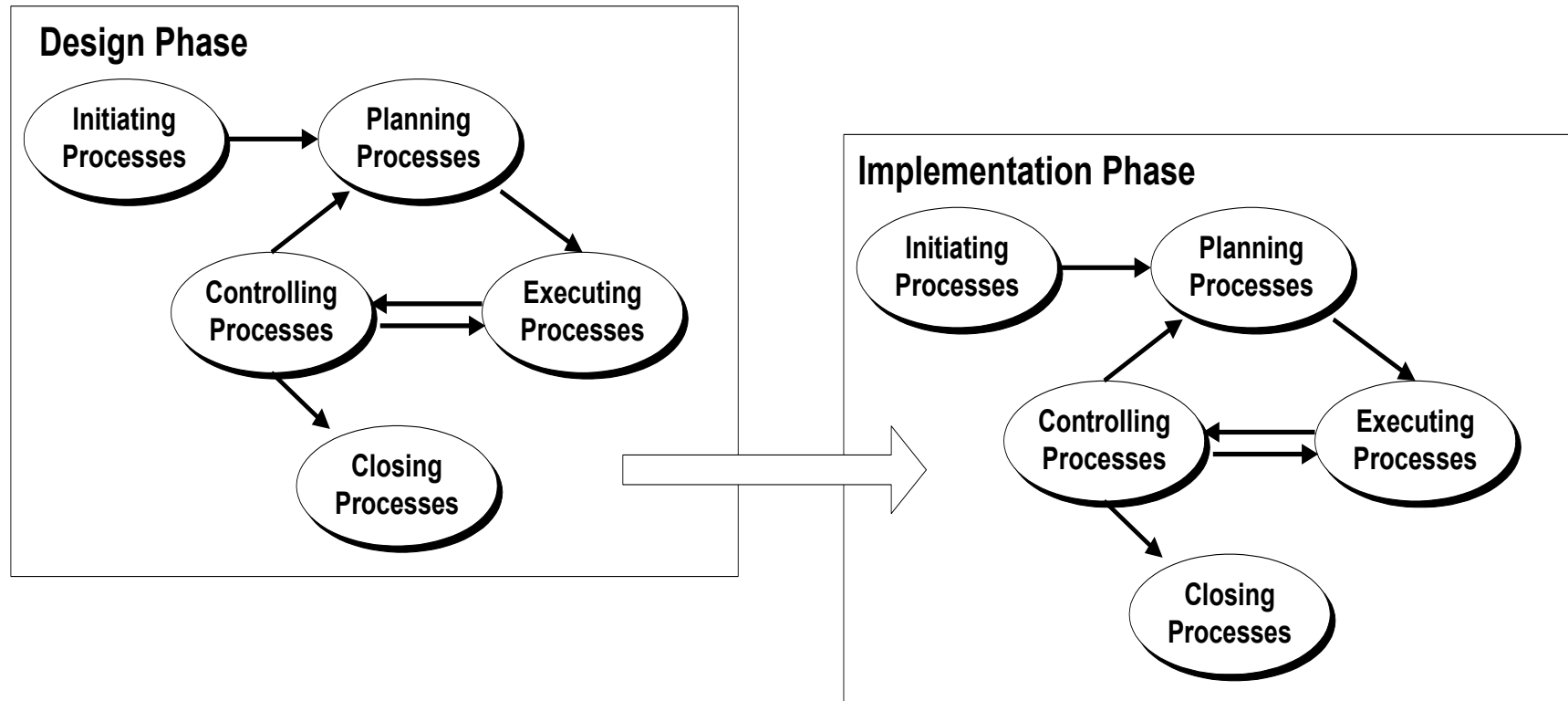
Source: Project Management Institute

- Project integration management
- Scope
- Time
- Cost
- Quality
- Human resource
- Communications
- Risk
- Procurement

- Project are composed of process
- Process Groups
 1. Initiating
 2. Planning
 3. Executing
 4. Controlling
 5. Closing
- Each process is described by:
 - Inputs
 - Tools & Techniques
 - Outputs
- Note: process are repeated in each each phase







- Inputs
 - Product Description
 - Strategic plan
 - Selection Criteria
 - Historical Information
- Outputs
 - Charter
 - Manager assigned
 - Constraints
 - Assumptions

- Devising and maintaining a workable scheme to accomplish the business need that the phase was undertaken to address
 - Scope Planning
 - Scope Definition
 - Activity Definition
 - Activity Sequencing
 - Activity Duration Estimating
 - Resource Planning
 - Cost Estimating
 - Cost Budgeting
 - Risk Planning
 - Schedule Development
 - Quality Planning
 - Communications Planning
 - Organization Planning
 - Staff Acquisition
 - Procurement Planning
 - Project Plan Development

- Coordinating people and other resources to carry out the plan
 - Plan Execution
 - Scope Verification
 - Quality Assurance
 - Team Development
 - Information Distribution
 - Solicitation
 - Source Selection
 - Contract Administration

- Ensuring that phase objectives are met by monitoring and measuring progress and taking corrective measures when necessary
 - Overall Change Control
 - Scope Change Control
 - Schedule Control
 - Cost Control
 - Quality Control
 - Performance Reporting
 - Risk Response Control

- Formalizing acceptance of the phase and bringing it to an orderly end
 - Administrative Closure
 - Contract Close-out

Process Groups Knowledge Area	Initiating	Planning	Executing	Controlling	Closing
4. Project Integration Management		4.1 Project Plan Development	4.2 Project Plan Execution	4.3 Integrated Change Control	
5. Project Scope Management	5.1 Initiation	5.2 Scope Planning 5.3 Scope Definition		5.4 Scope Verification 5.5 Scope Change Control	
6. Project Time Management		6.1 Activity Definition 6.2 Activity Sequencing 6.3 Activity Duration Estimating 6.4 Schedule Development		6.5 Schedule Control	
7. Project Cost Management		7.1 Resource Planning 7.2 Cost Estimating 7.3 Cost Budgeting		7.4 Cost Control	
8. Project Quality Management		8.1 Quality Planning	8.2 Quality Assurance	8.3 Quality Control	
9. Project Human Resource Management		9.1 Organizational Planning 9.2 Staff Acquisition	9.3 Team Development		
10. Project Communications Management		10.1 Communications Planning	10.2 Information Distribution	10.3 Performance Reporting	10.4 Administrative Closure
11. Risk Project 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 Procurement Planning 12.2 Solicitation Planning	12.3 Solicitation 12.4 Source Selection 12.5 Contract Administration		12.6 Contract Closeout

- Define your management review points
 - “Phase exits” or “kill points”
 - Ensure continued alignment with goals
 - Form of Validation & Verification (V&V)
 - More later in term

Structural frame:

Focuses on roles and responsibilities, coordination and control. Organization charts help define this frame.

Human resources

frame: Focuses on providing harmony between needs of the organization and needs of people.

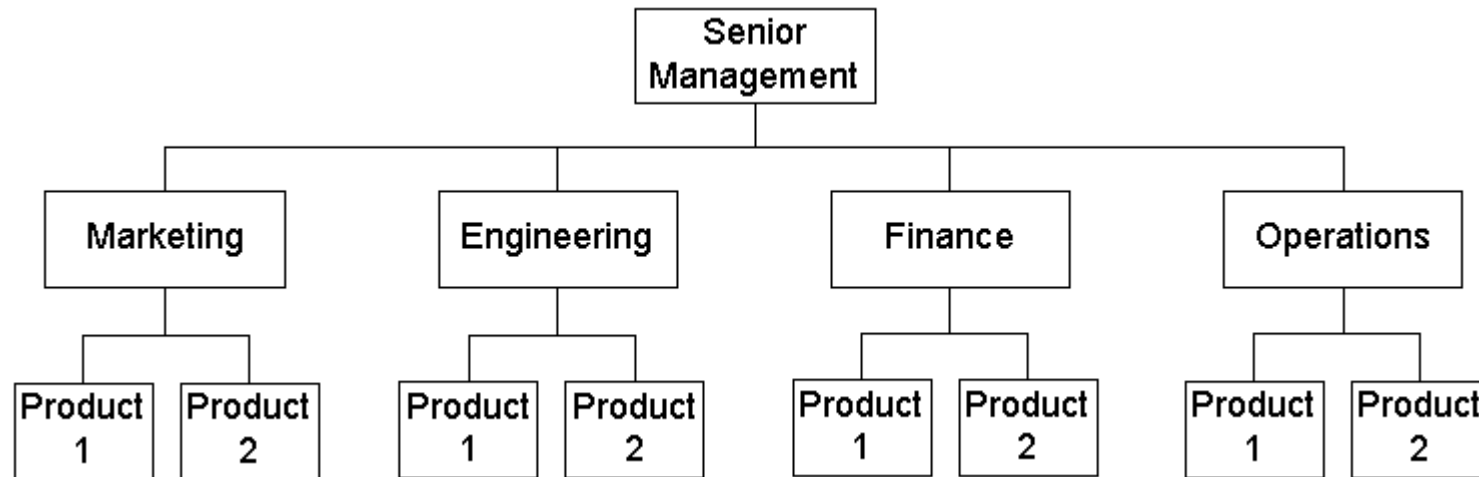
Political frame:

Assumes organizations are coalitions composed of varied individuals and interest groups. Conflict and power are key issues.

Symbolic frame:

Focuses on symbols and meanings related to events. Culture is important.

- Functional
 - Engineering, Marketing, Design, etc
 - Production and Logistics (P&L) from production
- Project
 - Project A, Project B
 - Income from projects
 - PM has P&L responsibility
- Matrix
 - Functional and Project based
 - Program Mgmt. Model
 - Shorter cycles, need for rapid development process

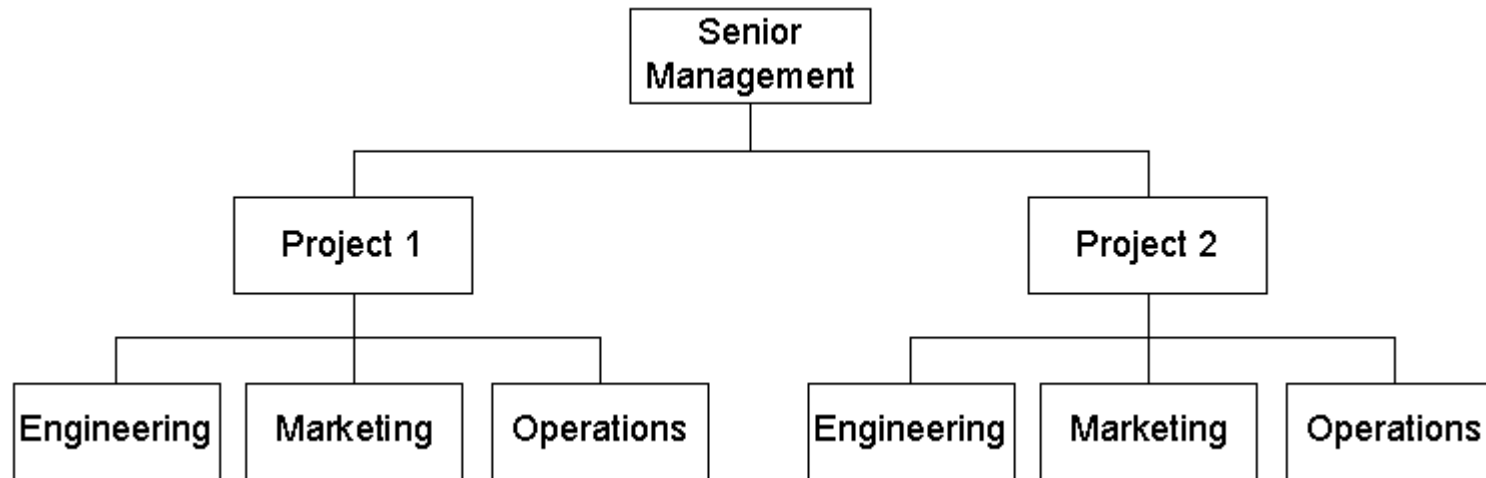


- Pros

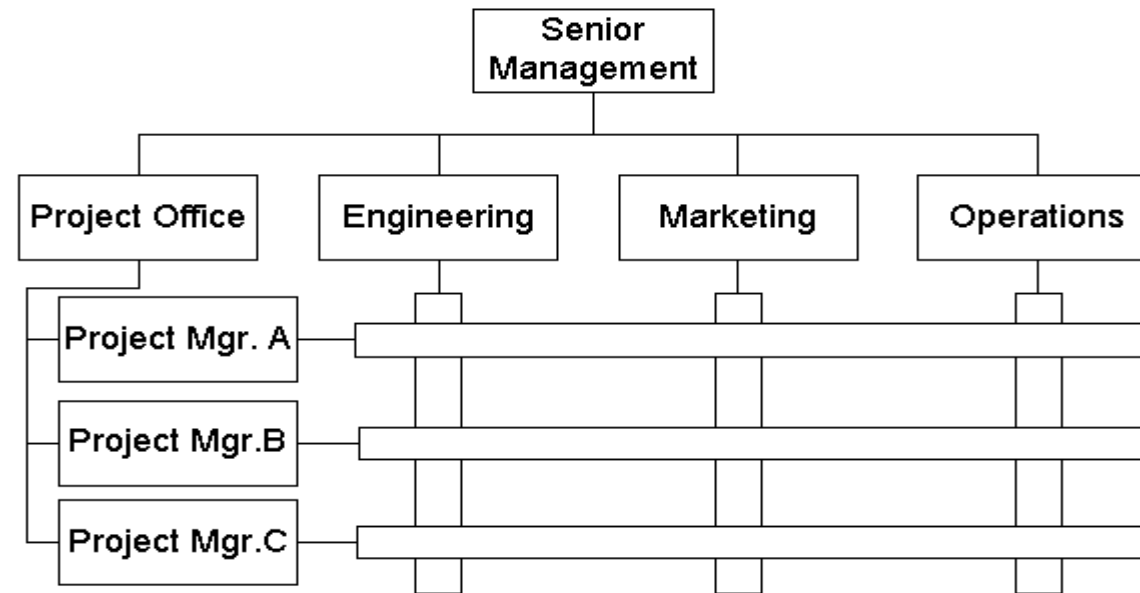
- Clear definition of authority
- Eliminates duplication
- Encourages specialization
- Clear career paths

- Cons

- “Walls”: can lack customer orientation
- “Silos” create longer decisions cycles
- Conflicts across functional areas
- Project leaders have little power



- Pros
 - Unity of command
 - Effective inter-project communication
- Cons
 - Duplication of facilities
 - Career path
- Examples: defense avionics, construction



- Pros

- Project integration across functional lines
- Efficient use of resources
- Retains functional teams

- Cons

- Two bosses for personnel
- Complexity
- Resource & priority conflicts

- Weak, Strong, Balanced
- Degree of relative power
- Weak: functional-centric
- Strong: project-centric

Organization Type Project Characteristics	Functional	Matrix			Projectized
		Weak Matrix	Balanced Matrix	Strong Matrix	
Project Manager's Authority	Little or None	Limited	Low to Moderate	Moderate To High	High to Almost Total
Percent of Performing Organization's Personnel Assigned Full-time to Project Work	Virtually None	0-25%	15-60%	50-95%	85-100%
Project Manager's Role	Part-time	Part-time	Full-time	Full-time	Full-time
Common Title for Project Manager's Role	Project Coordinator/ Project Leader	Project Coordinator/ Project Leader	Project Manager/ Project Officer	Project Manager/ Program Manager	Project Manager/ Program Manager
Project Management Administrative Staff	Part-time	Part-time	Part-time	Full-time	Full-time

PMBOK Guide, 2000, p. 19

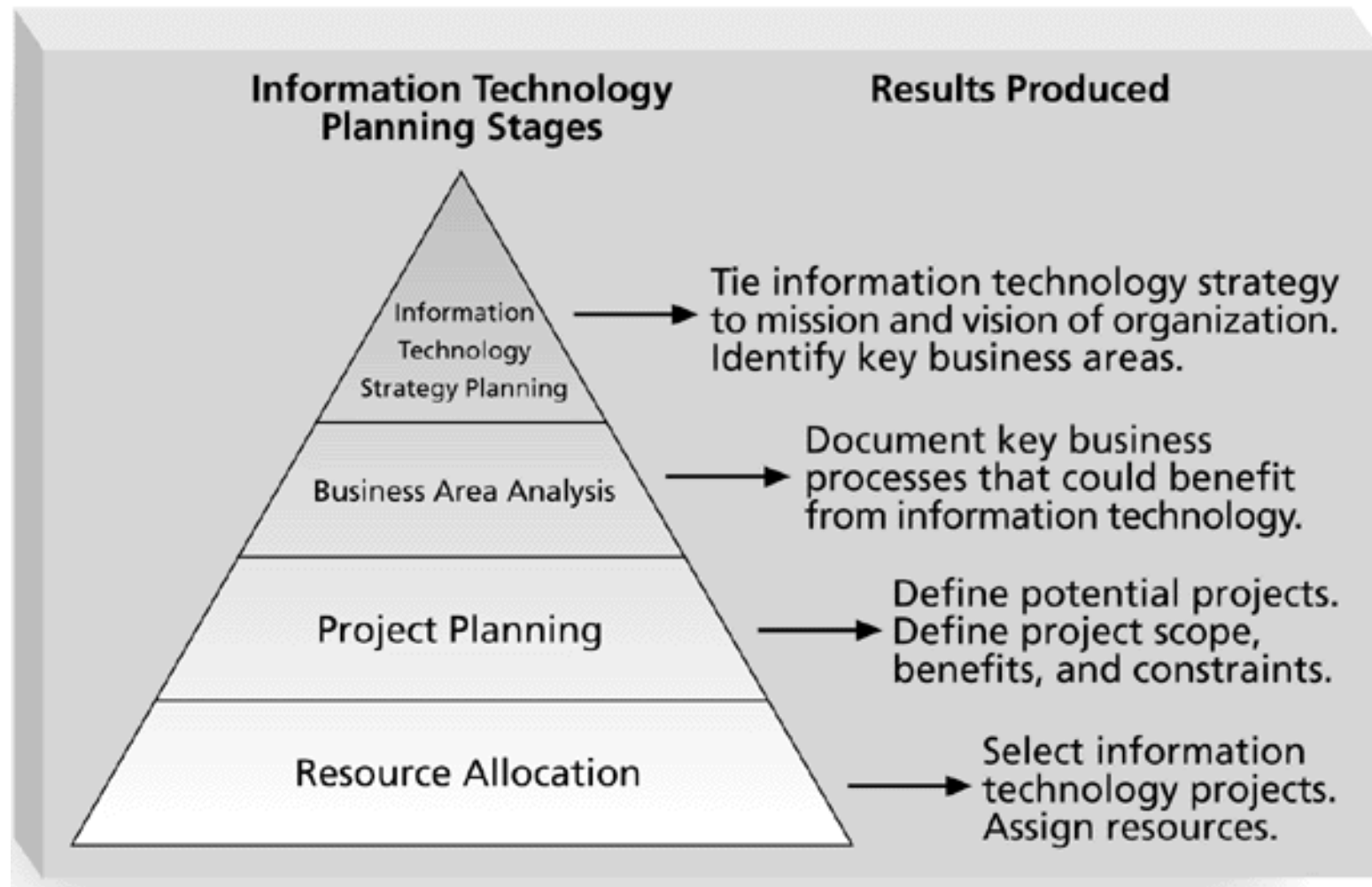
- Form can greatly impact your role
- Determine what skills you'll need from which functions
- The new “Project Office” [1-2]
 - A. As centralized project management
 - B. As coach and info. office to project teams
- The “Enterprise PMO” (EPMO)

[1] http://www.projectperfect.com.au/info_setup_po.php

[2] http://en.wikipedia.org/wiki/Project_management_office

REASON FOR INVESTING IN INFORMATION TECHNOLOGY PROJECTS	RANK BASED ON OVERALL VALUE OF PROJECTS
Supports explicit business objectives	1
Has good internal rate of return (IRR)	2
Supports implicit business objectives	3
Has good net present value (NPV)	4
Has reasonable payback period	5
Used in response to competitive systems	6
Supports management decision making	7
Meets budgetary constraints	8
High probability of achieving benefits	9
Good accounting rate of return	10
High probability of completing project	11
Meets technical/system requirements	12
Supports legal/government requirement	13
Good profitability index	14
Introduces new technology	15

Bacon, James. The Use of Decision Criteria in Selecting Information Systems/Technology Investments, *MIS Quarterly*, Vol. 16, No. 3 (September 1992).



- There are usually (always?) more projects than available time and resources to implement them
 - Therefore: It is important to follow a logical process for selecting IT projects to work on

- Methods include
 - Focusing on broad needs
 - Categorizing projects
 - Financial methods
 - Weighted scoring models
 - (last 2 models covered later in term)

- It is often difficult to provide strong justification for many IT projects, but everyone agrees they have a high value
 - “It is better to measure gold roughly than to count pennies precisely”
- Three important criteria for projects:
 - There is a need for the project
 - There are funds available
 - There’s a strong will to make the project succeed

- One categorization: whether project addresses
 - a problem
 - an opportunity
 - a directive
- Another: how long it will take & when it is needed
- Another: overall priority of the project

- Portfolio: a group of IT project under a coordinated management structure
- Different ‘portfolio models’ are available:
 - Economic return model
 - NPV, IRR, ROI
 - Cost-benefit model
 - Can include less tangible factors
 - Market research model
 - For new products
- Each considers relative value and resource/budget interactions
- More details in Session 4

- A 5 level approach (from CIO magazine)
 1. Create a Portfolio Database
 - Information needed
 - Project names & descriptions
 - Estimated costs, timeframes, staffing
 - Benefits
 - Spotting redundancies
 - Communication across orgs & teams
 - Holistic view

2. Prioritize Projects

- Try quantifiable rankings
 - Risk and return
- Still subjectivity and disagreements

3. Divide into budgets based on type

- To align with business needs
- Ex: utilities ('keeping the lights on'), incremental upgrades, strategic investments

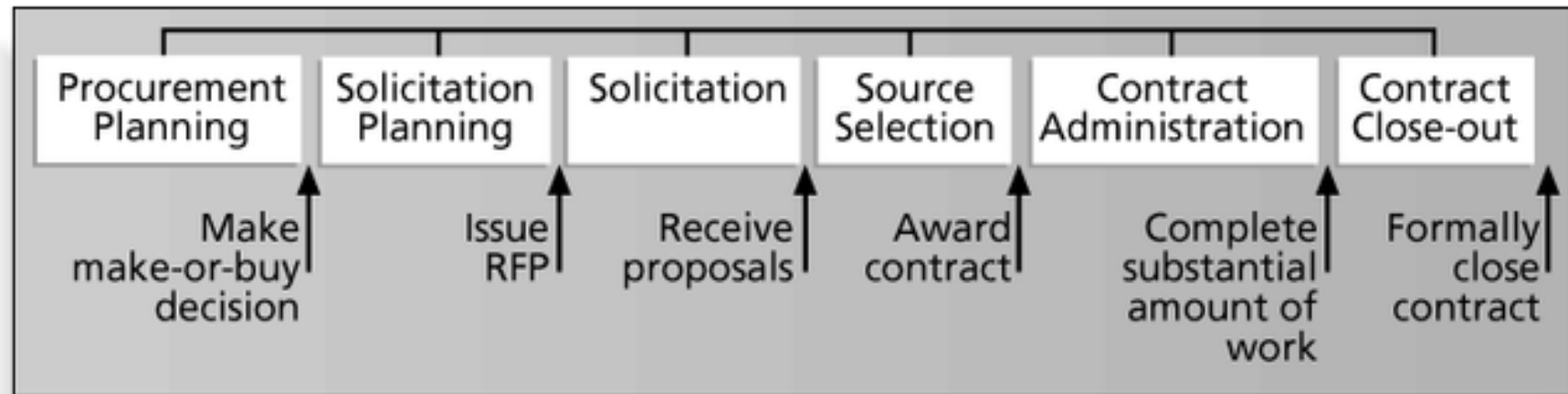
4. Automate the repository
 - Input of new data (new projects)
 - Automated tracking (PM software integration)
5. Apply modern portfolio theory
 - More advanced than most of us need

- Products
 - Oracle|Primavera - ProSight Portfolios
 - <http://www.oracle.com/applications/primavera/primavera-portfolio-management.html>
 - <http://www.oracle.com/applications/primavera/primavera-portfolio-management-data-sheet.pdf>
 - <http://www.oracle.com/applications/primavera/primavera-cpic-budgeting-budget-year-2010-data-sheet.pdf>
 - Planview
 - <http://www.planview.com/>
 - <http://www.planview.com/products/enterprise/project-portfolio-management.aspx>
 - <http://www.planview.com/products/enterprise/enterprise-portfolio-management.aspx>

- Procurement means acquiring goods and/or services from an outside source
 - a.k.a. purchasing or outsourcing
- Know how your project fits-into this model
 - Are you building “in-house”? “for hire”?
 - Thus are you the ‘outside source’ ?
 - As a startup? (thus in-house but as basis for the business itself)

- To reduce both fixed and recurrent costs
- To allow the client organization to focus on its core business
- To access skills and technologies
- To provide flexibility
- To increase accountability

- Procurement planning: determining what to procure and when
- Solicitation planning: documenting product requirements and identifying potential sources
- Solicitation: obtaining quotations, bids, offers, or proposals as appropriate
- Source selection: choosing from among potential vendors
- Contract administration: managing the relationship with the vendor
- Contract close-out: completion and settlement of the contract



- Make-or-buy analysis (build vs. buy)
 - Determining whether a particular product or service should be made or performed inside the organization or purchased from someone else. Often involves financial analysis

- Experts
 - Both internal and external, can provide valuable inputs in procurement decisions

- Assume you can lease an item you need for a project for \$150/day. To purchase the item, the investment cost is \$1,000, and the daily cost would be another \$50/day.
- How long will it take for the lease cost to be the same as the purchase cost?
- If you need the item for 12 days, should you lease it or purchase it?

- Set up an equation so the “make” is equal to the “buy”
- In this example, use the following equation. Let d be the number of days to use the item.
$$\$150d = \$1,000 + \$50d$$
- Solve for d as follows:
 - Subtract $\$50d$ from the right side of the equation to get
$$\$100d = \$1,000$$
 - Divide both sides of the equation by $\$100$
$$d = 10 \text{ days}$$
- The lease cost is the same as the purchase cost at 10 days
- If you need the item for > 12 days, then purchase it

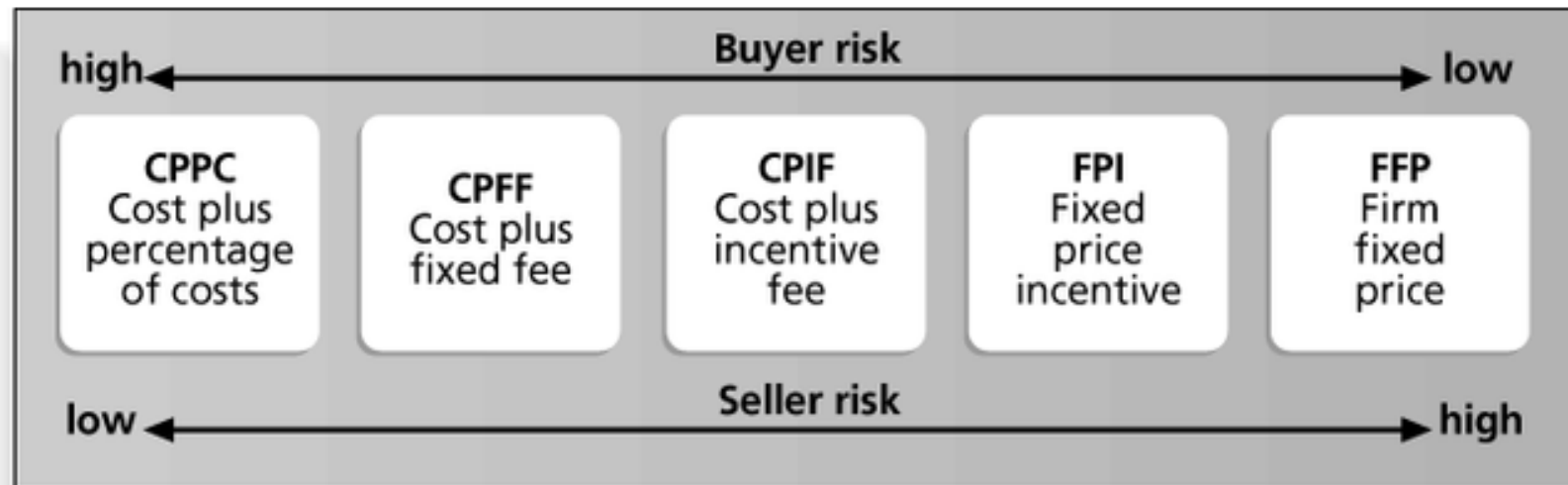
- Fixed price or lump sum: involve a fixed total price for a well-defined product or service
- Cost reimbursable: involve payment to the seller for direct and indirect costs
- Time and material contracts: hybrid of both fixed price and cost reimbursable, often used by consultants
- Unit price contracts: require the buyer to pay the seller a predetermined amount per unit of service

- Cost plus incentive fee (CPIF)
 - Buyer pays seller for allowable performance costs plus a predetermined fee and an incentive bonus
- Cost plus fixed fee (CPFF)
 - Buyer pays seller for allowable performance costs plus a fixed fee payment usually based on a percentage of estimated costs
- Cost plus percentage of costs (CPPC)
 - Buyer pays seller for allowable performance costs plus a predetermined percentage based on total costs

Procurement Management

Contract Types Versus Risk

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- A description of the work required for the project
- Sets the “boundary conditions”
- SOW vs. CSOW (Contract SOW)
 - Latter: uses legal language as part of a competitive bidding scenario
- Can be used in the final contract – be careful, be specific, be clear

- Typically done after approval (after “Go”)
- Can be multiple versions
 - 1. List of deliverables for an RFP
 - 2. More detailed within final RFP
 - 3. Binding version from contract

- **Scope of Work:** Describe the work to be done to detail. Specify the hardware and software involved and the exact nature of the work.
- **Location of Work:** Describe where the work must be performed. Specify the location of hardware and software and where the people must perform the work
- **Period of Performance:** Specify when the work is expected to start and end, working hours, number of hours that can be billed per week, where the work must be performed, and related schedule information. Optional “Compensation” section.
- **Deliverables Schedule:** List specific deliverables, describe them in detail, and specify when they are due.
- **Applicable Standards:** Specify any company or industry-specific standards that are relevant to performing the work. Often an Assumptions section as well.
- **Acceptance Criteria:** Describe how the buyer organization will determine if the work is acceptable.
- **Special Requirements:** Specify any special requirements such as hardware or software certifications, minimum degree or experience level of personnel, travel

- A high-level project description
- Often precedes SOW
- Often 2-4 pages (can be longer)

- Overview
 - Business need
 - Objectives
 - Method or approach
- General scope of work
- Rough schedule & budget
- Roles & responsibilities
- Assumptions
- Out of scope items

Homework 1 Assignment

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- Write a Project Charter for your project
- Combines elements of a SOW
- 2-3 pages
- Use format of your choice, but outlined as in next slides
- Graded on content, not format

- Download the word template from
 - http://emanueledellavalle.org/slides/P&MSP2011_02a_template-homework-1.doc
- Prepare your homework according to the following slides
- Archive your homework in a zip file
- Register on <http://www.easychair.org>
- Access <https://www.easychair.org/conferences/?conf=pmsp2011>
- Submit your project clicking on “New Submission” and providing all required information.
 - Make sure that your homework is archived in a *.zip file

- A project Charter includes:
 - Overview (2-4 paragraphs)
 - What the system is (summary)
 - Who will use it
 - What problem is it solving (Objectives)
 - Scope of Work (outline format or text)
 - What the system is (details)
 - Deliverables
 - Rough time estimate (2 months or 2 yrs?) & budget (10K€ or 10M€?)
 - Roles & responsibilities
 - PM (role an
 - Team (required skills)
 - Primary stakeholders
 - Assumptions
 - Out of scope items

- Retail Web Site
 - D1 Full catalog
 - D2 Shopping-cart system
 - D3 Search engine
 - D4 User registration system

- Trading System
 - D1 Equities order entry system
 - D2 Portfolio management
 - D3 Order execution engine
 - D4 Integration with X legacy systems
 - D5 Security infrastructure

- Corporate Application
 - D1 Network and hardware
 - D2 Web-based HR portal
 - D3 Connectivity for VPN
 - D4 “Asset Management Viewport” application
 - D5 Customized Reporting Engine
 - Allowing users to data mart
 - Delivery into HTML and Excel
 - D6 User manuals

- Schedule
 - We anticipate an overall 12-14 month development timeframe
 - The project is expected to start in Q1 2010 and complete in Q3 2011
 - The initial release is expect within 10 months with the follow-on delivery within 4-6 months

- Classes of Personnel
 - **Junior** Developer/Quality Assurer/Document Writer
 - **Senior** developer/Quality Assurer/Document Writer
 - **Subject Matter Expert** (business analyst, software architect, information architect, built engineers):
 - **Technical Manager**
 - **Project Manager**

- Personnel Costs and Prices (Person Month Rate)

	Net Salary	Gross Salary	Industrial Cost	Standard Price
PM	4500	7500	12000	15600
SMA/TM	3000	5000	8000	10400
senior	2250	3750	6000	7800
junior	1500	2500	4000	5200

- Other costs
 - Hardware, software, etc.
 - Travels and Accommodations

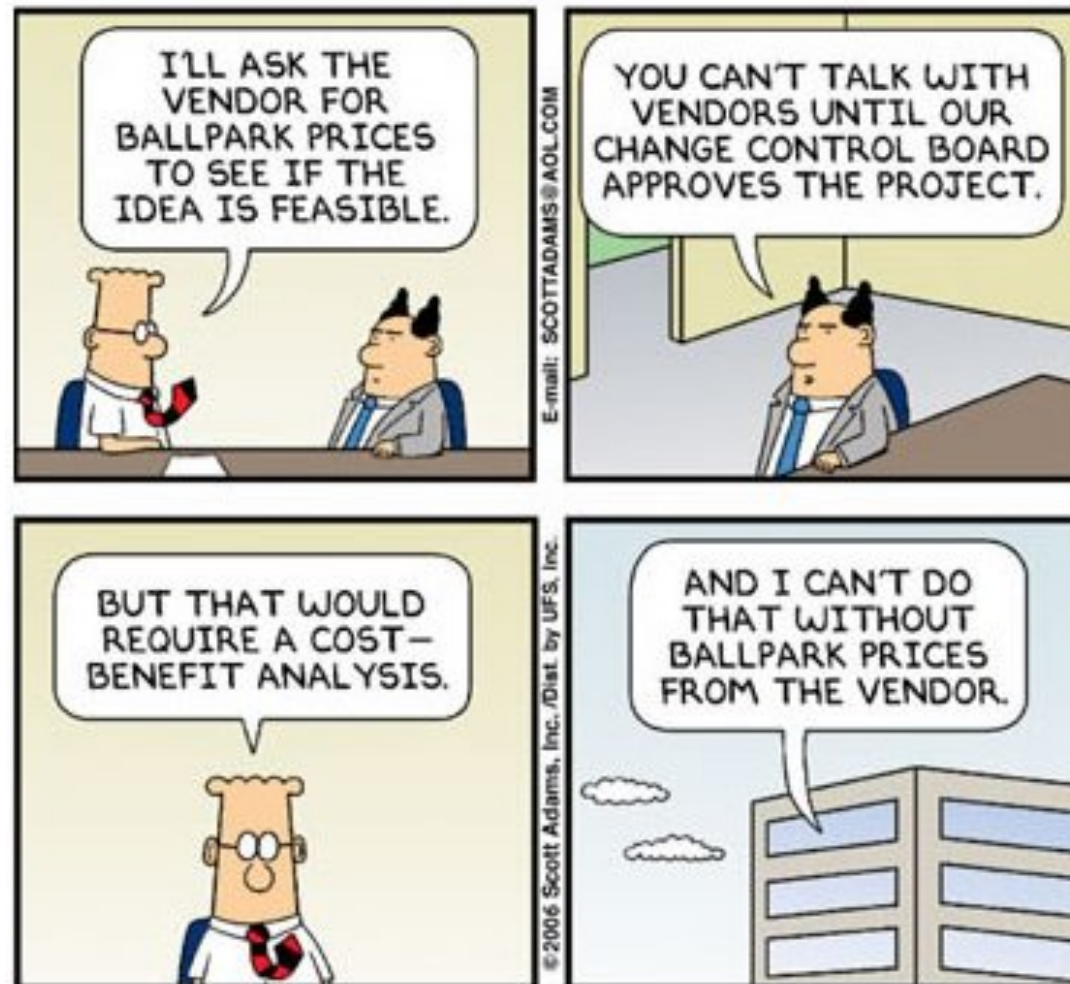
- Choose the mix required by your project
- Example

	Industrial Cost	Standard Price	Person Month Mix	Person Month Cost	Person Month Price
PM	12000	15600	10%	1200	1560
SMA/TM	8000	10400	20%	1600	2080
senior	6000	7800	30%	1800	2340
junior	4000	5200	40%	1600	2080
			100%	6200	8060

Homework 1 Assignment

Rough schedule & budget

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Homework 1 Assignment

Primary Stakeholders

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- Sponsor:
 - VP of Marketing
 - Five Star Brokerage Consortium
 - Bill Smith, CEO

- Users:
 - Call center operators
 - Our partner banks

- Customers:
 - Attorneys from small-to-mid size law firms
 - Males 30-45 earning \$75K or more

- We will reuse the architecture from the previous ordering system
- The system will be built using an ASP model
- Customer will provide necessary business experts as needed during development
- System will run on existing networking and computer resources
- Customer will sign-off on interim deliverables within one week of each delivery
- All import data will be available in XML format
- This will be a web-based application
- Our in-house development team will do the work
- The rendering engine will be licensed from a third party
- We will partner with an overseas development firm to create the security systems

Homework 1 Assignment

Out of Scope

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- News feeds
- Dynamic pricing
- Jazzy color picker
- Auction engine
- EDI support
- Legacy integration
- Help system

Questions?

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- McConnell: 7 “Lifecycle Planning”
- Schwalbe: 3 “Project Integration Management” (62-67), 4 “Project Scope Management”
- Review [projectreference.com](http://www.projectreference.com): “Sample SOW and Project Charter Docs”
 - <http://www.projectreference.com/#SOWs>