

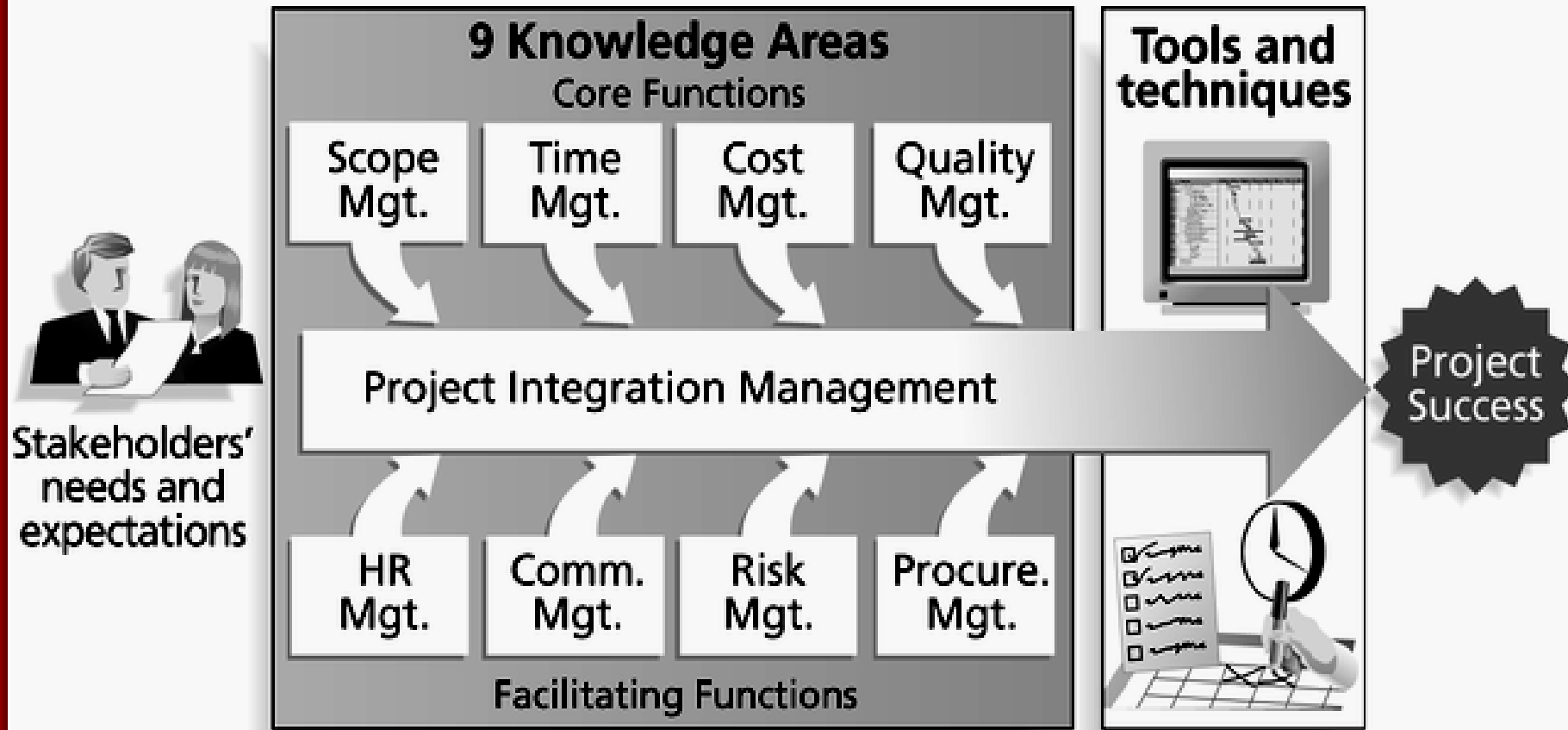
Software Project Management

Lecture 6

Words of Wisdom

- The problem is that we sow different than what we expect to reap. You will reap what you sow.
- *If anyone does a righteous deed it ensures to the benefit of his own soul; if he does evil it works against (his own soul). In the end will ye (all) be brought back to your Lord. Al-Quran(45:15).*

PMBok – Knowledge Areas



Integration Management

- The Project Integration Management Knowledge Area includes the processes and activities needed to identify, define, combine, unify, and coordinate the various processes and project management activities within the Project Management Process Groups.
- Develop Project Charter
 - Developing the project charter that formally authorizes a project or a project phase.
- Develop Preliminary Project Scope Statement
 - Developing the preliminary project scope statement that provides a high-level scope narrative.
- Develop Project Management Plan
 - Documenting the actions necessary to define, prepare, integrate, and coordinate all subsidiary plans into a project management plan.
- Direct and Manage Project Execution
 - Executing the work defined in the project management plan to achieve the project's requirements defined in the project scope statement.
- Monitor and Control Project Work
 - Monitoring and controlling the processes used to initiate, plan, execute, and close a project to meet the performance objectives defined in the project management plan.

Scope Management

- A subset of project management that includes the processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully.
- **Scope Planning** – creating a project scope management plan that documents how the project scope will be defined, verified, controlled, and how the work breakdown structure (WBS) will be created and defined.
- **Scope Definition** – developing a detailed project scope statement as the basis for future project decisions.
- **Create WBS** – subdividing the major project deliverables and project work into smaller, more manageable components.
- **Scope Verification** – formalizing acceptance of the completed project deliverables.
- **Scope Control** – controlling changes to the project scope.

Time Management

- A subset of project management that includes the processes required to ensure timely completion of the project.
- Activity Definition
 - identifying the specific schedule activities that need to be performed to produce the various project deliverables.
- Activity Sequencing
 - identifying and documenting dependencies among schedule activities.
- Activity Resource Estimating
 - estimating the type and quantities of resources required to perform each schedule activity.
- Activity Duration Estimating
 - estimating the number of work periods that will be needed to complete individual schedule activities.
- Schedule Development
 - analyzing activity sequences, durations, resource requirements, and schedule constraints to create the project schedule.
- Schedule Control
 - controlling changes to the project schedule.

Cost Management

- A subset of project management that includes the processes required to ensure that the project is completed within the approved budget.
- Cost Estimating
 - developing an approximation of the costs of the resources needed to complete project activities.
- Cost Budgeting
 - aggregating the estimated costs of individual activities or work packages to establish a cost baseline.
- Cost Control
 - influencing the factors that create cost variances and controlling changes to the project budget.

Quality Management

- A subset of project management that includes the processes required to ensure that the project will satisfy the needs for which it was undertaken.
- Quality Planning
 - Identifying which quality standards are relevant to the project and determining how to satisfy them
- Quality Assurance
 - applying the planned, systematic quality activities to ensure that the project employs all processes needed to meet requirements.
- Quality Control
 - Monitoring specific project results to determine if they comply with relevant quality standards and identifying ways to eliminate causes of unsatisfactory performance

Human Resource Management

- A subset of project management that includes the processes required to make the most effective use of the people involved with the project.
- Human Resource Planning
 - Identifying and documenting project roles, responsibilities, and reporting relationships, as well as creating the staffing management plan.
- Acquire Project Team
 - Obtaining the human resources needed to complete the project.
- Develop Project Team
 - Improving the competencies and interaction of team members to enhance project performance.
- Manage Project Team
 - Tracking team member performance, providing feedback, resolving issues, and coordinating changes to enhance project performance.

Communication Management

- A subset of project management that includes the processes required to ensure timely and appropriate generation, collection, dissemination, storage, and ultimate disposition of project information.
- Communications Planning
 - determining the information and communications needs of the project stakeholders.
- Information Distribution
 - making needed information available to project stakeholders in a timely manner.
- Performance Reporting
 - collecting and distributing performance information. This includes status reporting, progress measurement, and forecasting.
- Manage Stakeholders
 - managing communications to satisfy the requirements of and resolve issues with project stakeholders.

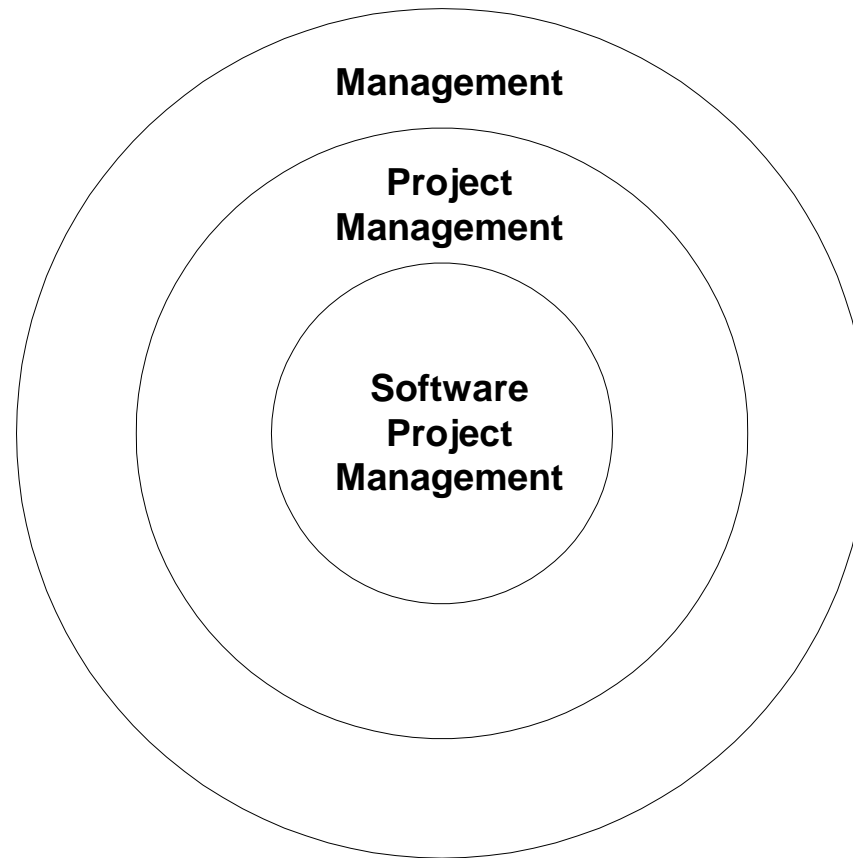
Project Risk Management

- Project Risk Management includes the processes concerned with conducting risk management planning, identification, analysis, responses, and monitoring and control on a project; most of these processes are updated throughout the project.
- Risk Management Planning
 - deciding how to approach, plan, and execute the risk management activities for a project.
- Risk Identification
 - determining which risks might affect the project and documenting their characteristics.
- Qualitative Risk Analysis
 - prioritizing risks for subsequent further analysis or action by assessing and combining their probability of occurrence and impact.
- Quantitative Risk Analysis
 - numerically analyzing the effect on overall project objectives of identified risks.
- Risk Response Planning
 - developing options and actions to enhance opportunities, and to reduce threats to project objectives.
- Risk Monitoring and Control
 - tracking identified risks, monitoring residual risks, identifying new risks, executing risk response plans, and evaluating their effectiveness throughout the project life cycle.

Procurement Management

- Project Procurement Management includes the processes to purchase or acquire the products, services, or results needed from outside the project team to perform the work. The organization can be either the buyer or seller of the product, service, or results under a contract.
- Plan Purchases and Acquisitions
 - determining what to purchase or acquire and determining when and how.
- Plan Contracting
 - documenting products, services, and results requirements and identifying potential sellers.
- Request Seller Responses
 - obtaining information, quotations, bids, offers, or proposals, as appropriate.
- Select Sellers
 - reviewing offers, choosing among potential sellers, and negotiating a written contract with each seller.
- Contract Administration
 - managing the contract and relationship between the buyer and seller, reviewing and documenting how a seller is performing or has performed to establish required corrective actions and provide a basis for future relationships with the seller, managing contract-related changes and, when appropriate, managing the contractual relationship with the outside buyer of the project.
- Contract Closure
 - completing and settling each contract, including the resolution of any open items, and closing each contract applicable to the project or a project phase.

Software Project Management



CMM

- Mature VS immature software processes
 - Immature software processes imply that projects are executed without many guidelines, and the outcome of a project depends largely on the capability of the team and project leader.
- CMM Levels
 - Initial
 - A project is executed in a manner that the team and project manager see fit
 - Repeatable
 - Well established project management practices are employed (but not organization wide)
 - Defined
 - Organization wide processes have been defined and followed
 - Managed
 - It is possible to quantitatively predict and control the process on a project
 - Optimized
 - The process capability is improved and the improvement is evaluated

Key Process Areas and PM

- Level 2 KPAs
 - Requirements Management
 - Software Project Planning
 - Software Project Tracking and oversight
 - Software Subcontract Management
 - Software Quality Assurance
 - Software Configuration Management
- Level 3 KPAs
 - Integrated Software Management
 - Intergroup Coordination
 - Peer Reviews
- Level 4 KPAs
 - Quantitative Process Management
 - Software Quality Management

Project Initiation

Project Charter

- The agreement between
 - the organization providing the product or service, and
 - the customer organization requesting and receiving the project deliverable.
- The purpose of the charter is to publicize both new project and the role of new project manager
- It is a quick reference and overview of
 - what the project is about?
 - why it is being conducted?
 - who is involved and in what capacity?
 - and the general approach and timeline that exists for the project.

- It is created at the beginning of the project
 - approved by the key project stakeholders, and
 - is available for reference throughout the project life cycle.
- It is a single, consolidated source of information about the project in terms of initiation and planning, and provides information about project scope, objectives, deliverables, risks, and issues.
- It outlines an agreement between the project stakeholders of what the project will deliver and how.

Sample – Project Charter

- Introduction
 - Vision
 - Peto will support Falstaff project by providing an ordering interface to our CD vendor
 - Authority
 - William Page, VP of Development
 - Agent
 - Don Pedro, Project Manager
 - Background
 - The project will reuse the conceptual architecture from previous ordering systems
 - The stakeholder for the project will be the Falstaff project

- Project Definition

- Goals

- Build a reliable CD ordering system to integrate with Falstaff

- Scope

- Full lifecycle development of new system from existing system
 - Documentation and examples to support future extension and maintenance
 - Deployment and maintenance are out of scope for this project

- Drivers

- Schedule will be primary driver of the Peto project

- Constraints

- Peto must be completed and ready for integration testing with Falstaff by Q4 2001.

- Risks and Assets

- Inefficiency from new (to WebBooks) technology (Peto will be in Java) could cause schedule slip, increased budget, and reduced functionality or quality
- Feature creep from new developers could impact schedule or budget
- Requirements and architecture from WebBooks current ordering system will likely make requirements and design phase very efficient.

- Business Case

- Peto is critical to the success for the Falstaff project. See the Falstaff project charter for details on the overall business case.

Identifying stakeholders

- Narrow definition
 - Those groups or individuals who are vital to the survival and success of the project
 - You
 - Development team
 - Customers
 - Managers (within the company who are involved with approvals)
- Wider definition
 - Any individuals, group, or organizations who can affect, or be affected by the decisions and actions taken with respect to the project
 - Public interest groups
 - Trade associations
- Competitors!

Stakeholder Analysis

- This involves
 - Identification of Stakeholders
 - Stakeholders' Interests
 - Their comparative and relevant importance to the project
 - The ability of any particular stakeholder to influence other stakeholders' interest
- Groups of two or more people are political entities

Stakeholders Analysis

- Freeman's (1984) stakeholder analytical framework
- Freeman's concepts have been durable over the years, so that "the whole stakeholder theory is reducible to this one idea of Freeman's".
- The framework comprises two stages: identification and evaluation.
- Freeman's classical definition "A stakeholder is any group or individual who can affect or is affected by the achievement of the organization's objectives"
- There are different kinds of stakeholders, such as the people as well as groups inside and outside an organization.

Checklist Approach

- The first approach is using checklists specified to the generic types of stakeholders, such as 'customers, suppliers, competitors, users, managers, and developers'
- Such checklists can be adapted to make them more suitable for particular industries, e.g. doctors, patients, pharmacies, pharmaceutical companies.
- They can then be used to determine which specific groups of stakeholders are important in relation to the system.

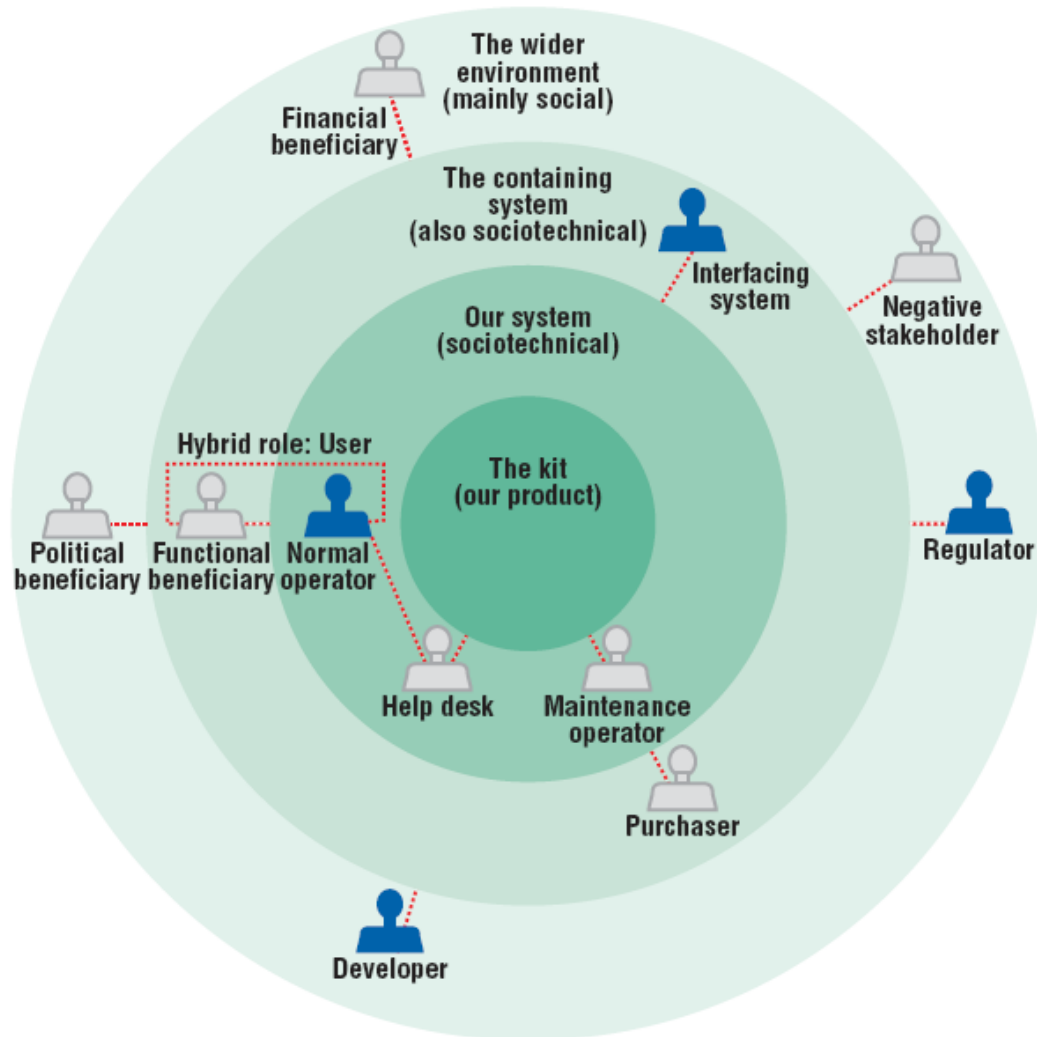
Question-based Approach

- A second approach is posing questions concerning the system and its nature.
- Relevant questions that help identify relevant groups and individuals:
 - Who are the initiators of the system?
 - Who are the sponsors of the system?
 - Who have to adopt the system and make it work?
 - Who are the intended users?
 - Who will receive the output of the System?
 - Who are the intended developers and operators of the System?
 - Who will be impacted and affected by the system?
 - Who will win or lose by using the System?

Network Approach

- A third approach that complements the other ones is the network approach.
- It focuses on the network of relations among organizations.
- Analyzing these dynamic networks of interactions and activities may help identify stakeholders and their roles
- Network theory also emphasizes the dynamic, flexible and contextual nature of organizational relations.
- This implies that stakeholders may influence each other, and therefore they cannot be viewed in isolation.
- Perceived interests and power of stakeholders are interactive and they may change over time.
- When stakeholders are identified, the results of this analysis can be visualized in a stakeholder map (also called a stakeholder web)
- Map shows and categorizes stakeholders and their mutual relations.

An onion model of stakeholder relationships



- Alexander, I. and S. Robertson, "Understanding Project Sociology by Modeling Stakeholders", January/February 2004, IEEE SOFTWARE

Stakeholders contribution

- Project Manager
 - Leads the project
- Sponsor
 - Provides authority for project to proceed
- Development Team
 - Provides skills, expertise, and effort to perform the tasks defined for the project
- Customer
 - Establishes the requirements for the project and provides funding
- Functional Managers
 - Establish company policy and provide resources



Stakeholders: Role and authority

Stakeholder	Roles	Approvals
Project Manager: Abdur Rehman	Defines, plans, controls, monitors, and leads the project	Makes recommendations for approval; signature authority for any purchase under Rs.50,000
Sponsor: Mohammed Waseem	Authority for most operational project decisions; helps guide the project; assists project manager with planning and approvals by other stakeholders	Approves personnel requests and hiring decisions; signs off on SOW and project plan before submitting to the customer; signature authority for any purchase under Rs.100,000
Customer: Experts Rashid Ali Sameena Sheikh	Experts who help define the project and develop product specifications	Works with project manager and team; make recommendations; no formal signature authorities

Defining Goals

- Every project has three primary goals
 - To create something, to complete within budget, and within agreed schedule
- Most project have multiple goals
- What seems obvious software project goal may not be seen the same way by everyone
 - Web-based timesheet data entry system
 - An training exercise by the recently hired programmers
 - A requirement before starting a new software development project for an external customer by the GM
 - A marketing tool to demonstrate the capabilities of the development team by the sales staff
 - Each of these views implies a different level of robustness, ease of use, and maintainability for the final end-product software deliverable

Goals

- Build a timesheet data entry system 
- Build and successfully deploy a web-based timesheet data application entry system for the engineering department's internal use before the beginning of the next major external software product development project 

Defining Objectives

- Most objectives tell what; the best ones also imply why
- Specific
 - Do you and your sponsor/customer both agree on the results needed for each of your project's objectives?
- Measurable
 - How will you know that you are achieving results?
- Achievable
 - Are objectives attainable? Why OR why not?
- Realistic
 - Do objectives address customer's requirements and real needs
- Time bound
 - Are there specific dates by which the objectives should be achieved?
 - Is there a clearly understood reason for each of the dates?

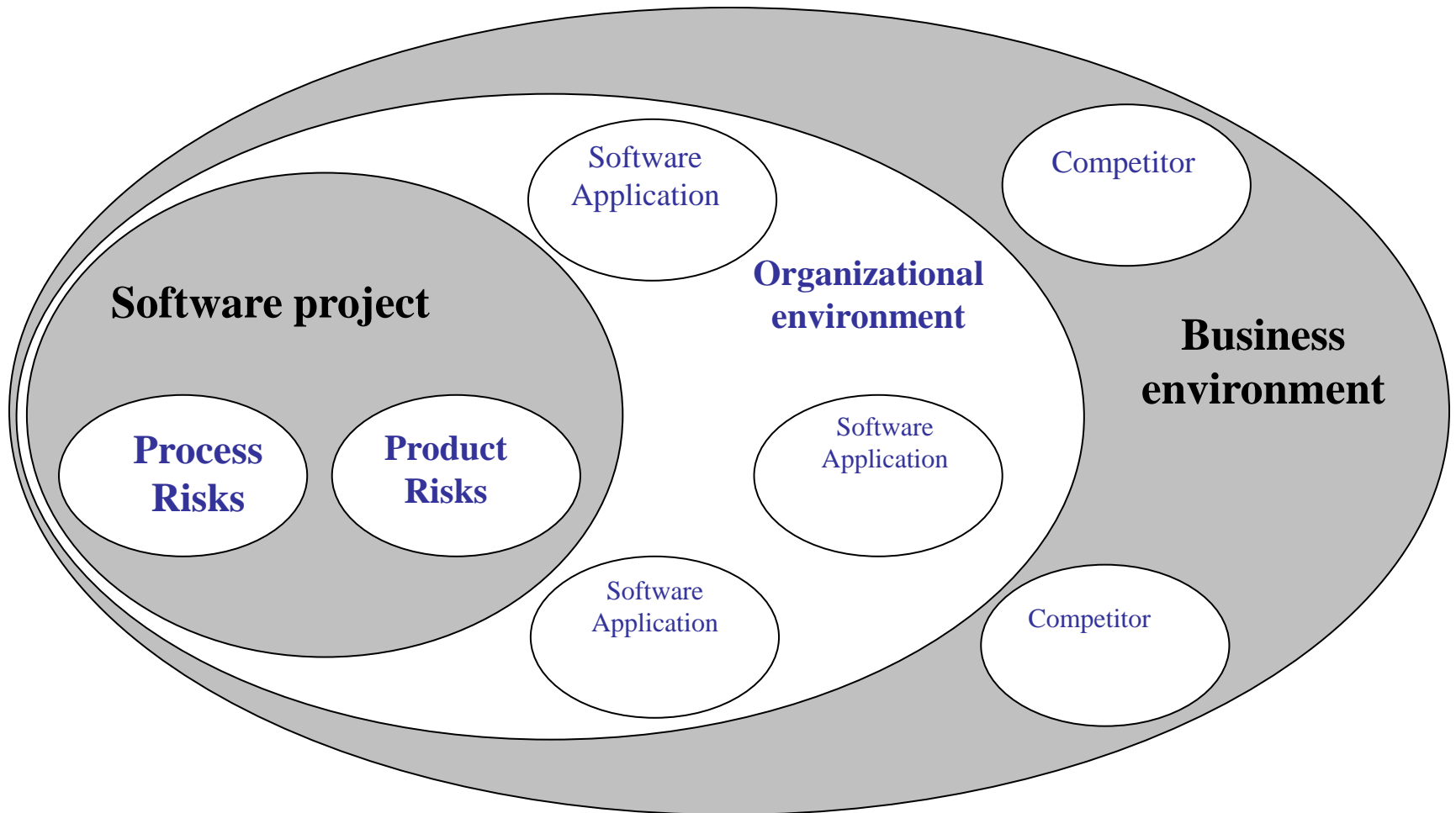
Project Scope

- The scope is the size of project
 - What is in? and what is out?
- It defines the assumptions for making all cost, schedule, and resource projects
- Puts boundaries on the planning process and the deliverables
- Separates outcomes or deliverables of the project from activities and deliverables outside the project scope
- Scope must be specified and agreed upon by the stakeholders
- Watch scope creep

Constraints and Risks

- Constraints are the real-world limits on the possibilities for your project
 - Rs.50,000 to buy a server
- Dictionary Definition of risk
 - the possibility of loss or injury
- Risk theorists
 - the potential for realization of unwanted, negative consequences of an event.
- Risk involves the likelihood that an undesirable event will occur as well as the severity of the consequences of the event should it occur

Types of Risk



Constraints to consider

- The budget
- The schedule
- The people
- The real world
- Facilities and equipment

Statement of Work (SOW)

- A formal project definition document
- A description of the work required for the project
- Sets the “boundary conditions”
- Typically developed after Project charter
 - Sometimes terms SOW and Project charter is used interchangeable
- Typically done after approval (after “Go”)
- It provides basis for the rest of the formal detailed project plan

SOW

- It contains
 - The purpose of statement
 - The scope statement
 - The project deliverables
 - The goals and objectives
 - The cost and schedule estimates
 - List of stakeholders
 - The chain of command
 - Assumptions and agreements
 - The communication plan

SOW Template (example)

- 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, requirements, documentation, testing, support, and so on.

Reading

- Alexander, I. and S. Robertson, “Understanding Project Sociology by Modeling Stakeholders”, January/February 2004, IEEE SOFTWARE

Q&A