SE440 SOFTWARE PROJECT MANAGEMENT

CHAPTER #2: PROJECT MANAGEMENT BACKGROUND

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Project Management History

- Project Management is not something new, but has been in use for tens of centuries in different ways of practice.
- Legendary Projects: Pyramids of Giza and those of Mexico, Great Wall of China, Olympic Games, Taj Mahal, and Panama Canal.
- Other Historical Projects: Marines, Commercial Jet Airplanes, Development of Vaccinations, Development of Computer Systems, Human Landing on the Moon, Development of the Global Positioning System (GPS), Development and Placement of the International Space Station in the Earth's Orbit, Development of Software Systems.
- Projects were most likely carried-on differently in terms of their Methods, Practices, Processes, Planning Methods, Execution, Monitoring and Control, and Evaluation.
- In 1956, the Association for the Advancement of Cost Engineering (AACE International) was established.
- In 2006, the AACE International released their Cost Management Framework as the first Integrated Process for Portfolio Management, Program Management and Project Management.

Project Management Definitions

- **Project Management (PM)** is:
  - A profession that is based on having a team to initiate, plan, execute, monitor and control, and close a set of tasks and activities (*e.g., a Project*) in order to SUCCESSFULLY achieve a set of Specific, Measurable, Achievable, Realistic, and Time-Bound (S.M.A.R.T.) objectives and goals in accordance with predefined Criterion, Schedule, and Budget.
  - The utilization of knowledge, methods, and tools in carrying-on the tasks and activities of a Project such that the Project Requirements are satisfied.
- **Software Project Management (SPM)** is:
- A discipline of Project Management that is specific to Software Management.

Project Management Importance

- When Project Management is applied effectively, it would lead to the following:
  - Meeting Business Objectives.
  - Satisfying Shareholders Expectations
  - Managing Change Requests
  - Managing and utilizing resources
  - Handling Problems/Issues/Risks/Threats
- While poor Project Management would lead to the following:
  - Disturbing the Project Schedule and Missing its Deadlines
  - Disturbing the Project Spendeture and its Allocated Budget
  - Failing to meet the Project predefined Specifications

Project Management Code of Ethics and Conduct

- PM-CEC Concepts:
  - **Responsibility**. A Project Team must assume full responsibility for their decisions, actions, and consequences throughout the Project lifecycle.
  - **Respect**. A Project Team must show respect to themselves, and to all others involved. In addition, they must take care of the Resources entrusted to them (e.g., people and money).
  - **Fairness**. A Project Team must make decisions and act objectively without pre-judgments.
  - **Honesty**. A Project Team must act in a truthful Manner in their communications and conducts.

What is a Project?

- A Project is:
  - A temporary mission that leads to a unique Product/Solution/Service with start/end dates, and within predefined Schedule/Budget/Specifications.
  - A group of individuals assembled to carry-on a set of tasks/activities related to predefined Requirements that should be accomplished within a pre-estimated time, without exceeding a pre-estimated budget, and while its outcomes satisfy a predefined set of specifications.
- Factors that lead to initiating new Projects:
  - Remaining at the Competitive Edge.
  - Responding to Changes in the Market Demand.
  - Responding to Customers' Requests.

What is a Program?

- A Program is a group of Projects (e.g., and sometimes subsidiary Programs and Activities) managed together and belong to the same entity.
- An Example would be the Hospital Program of Projects at JUST. This can include all of the Projects running for that hospital such as the hospital's building maintenance Project, and the hospital's Information Systems and Infrastructure Upgrade Projects

What is a Portfolio?

- A Portfolio is a group of Projects, Programs, Subsidiary Portfolios, and other Operational Activities.
- A Portfolio is managed by a Project Management Office (PMO) leveled at the Top-Management of that Organization. Program Management and Portfolio Management are different from Project Management in terms of their Objectives, Focus, Activities, Life-Cycles, and Benefits. However, Portfolios, Programs, Projects, and Operations share the same Stakeholders, Human Resources, and Physical Resources

Portfolios vs. Programs vs. Projects (Definitions)

Projects	A Project is a Temporary Mission that leads to a unique Product, Solution, and/or Service with specific Start-Date and End-Date.
Programs	A Program is a Group of Projects and Subsidiary Programs and Activities that are managed together and belong to the same entity.
Portfolios	A Portfolio is a Group of Projects, Programs, Subsidiary Portfolios, and Operational Activities. It is managed by a Project Management Office (PMO) at the Top-Management-Level of the concerned Organization.

Portfolios vs. Programs vs. Projects (Scopes)

Projects	A Project Scope of Work composes the Objectives and a high level Description of the Requirements of that Project along with a Description of the Tasks and Activities that will be carried-on throughout the Life-Cycle of that Project.
Programs	A Program's Scope of Work composes the Scopes of Work of its Integral Projects, Subsidiary Programs, and Operational Activities.
Portfolios	A Portfolio's Scope of Work composes the Scopes of Work of its Integral Programs, Subsidiary Portfolios, Projects, and Operational Activities. It composes the overall Scope of the concerned Organization, which must be aligned with its Strategic Objectives.

Portfolios vs. Programs vs. Projects (Planning Methods)

Projects	A Project Planning Function is used to transform the High-Level Information of the Project Objectives, Scope of Work, and Requirements into a set of Detailed Action Plans for managing, executing, monitoring, and controlling that Project throughout its Life-Cycle.
Programs	A Program Planning Function is used to guide and monitor the progress of the Plans of its Integral Projects, Subsidiary Programs, and Operational Activities; and to identify and watch their Inter-Dependencies.
Portfolios	A Portfolio Planning is used to guide and monitor the progress of the Plans of its Integral Programs, Subsidiary Portfolios, and Operational Activities; and to identify and watch for their Inter-Dependencies.

Portfolios vs. Programs vs. Projects (Purposes)

Projects	The Purpose of Managing a Project is to ensure that its Team Members are executing the Project Plan carefully such that the Project Objectives and predefined Requirements are accomplished as expected and as they were planned for.
Programs	The Purpose of Managing Programs is to coordinate the Activities of its Integral Projects, Subsidiary Programs, and Operational Activities.
Portfolios	The Purpose of Managing Portfolios is to coordinate and supervise its Integral Programs, Projects, and Operational Activities.

Portfolios vs. Programs vs. Projects (Change Requests)

Projects	Managing CHANGE-REQUESTS is used to keep changes controlled by implementing the necessary Change Processes.
Programs	Program Managers are expected to accept CHANGE-REQUESTS as necessary to facilitate the Delivery of the Components of their Programs.
Portfolios	Portfolio Managers are expected to monitor Changes in the Components of their Portfolios.

Portfolios vs. Programs vs. Projects (Monitoring and Control)

Projects	Project Managers are expected to conduct a series of Quality Assurance and Quality Control Activities throughout the execution of their Projects.
Programs	Program Managers are expected to monitor the Progress of the Components of their Programs. This is to ensure the Satisfaction of the Goals, Schedules, Budget, and Benefits of their Programs.
Portfolios	Portfolio Managers are expected to monitor any Strategic Change across the Components of their Portfolios.

Portfolios vs. Programs vs. Projects (Success Criteria)

Projects	A Project is considered SUCCESSFUL if and only it is completed: - ON-TIME. Completed as per the pre-determined Schedule. - WITHIN-BUDGET. Spendeture should not exceed the allocated Budget. - WHILE-MEETING-SPECS. Product's Quality is at the expected level. - WHILE-ENSURING-THE-CUSTOMER-SATISFACTION. Preserving the Customer's Satisfaction with the delivered Product is at least as expected.
Programs	A Program is considered SUCCESSFUL if and only if all of its Integral Components are SUCCESSFUL.
Portfolios	A Portfolio is considered SUCCESSFUL if and only if all of its Integral Components are SUCCESSFUL.

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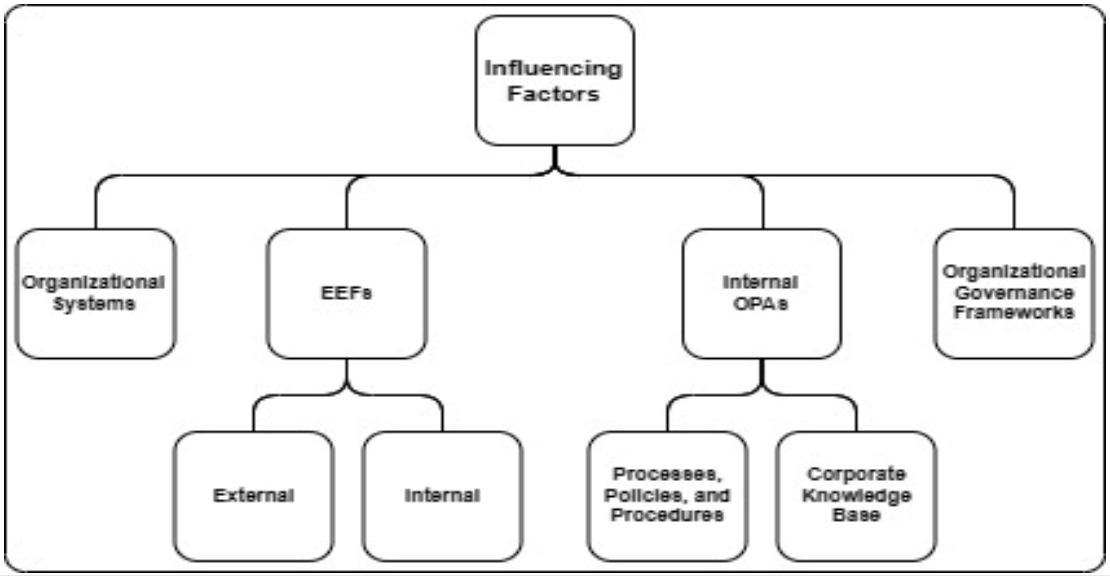
Projects Operational Environmental Influencing Factors



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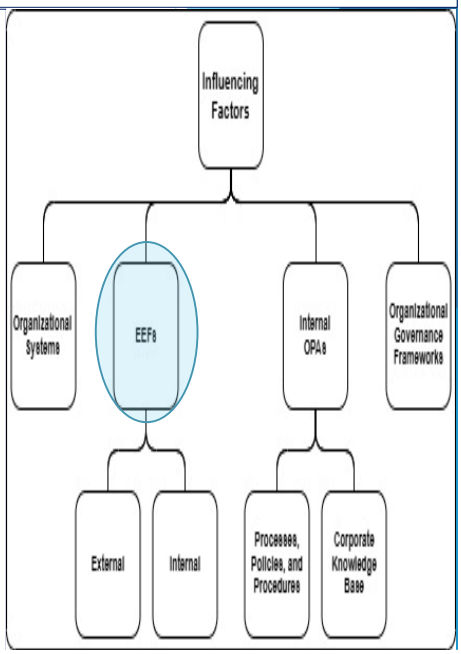
Operational Enterprise Environmental Factors (EEFs)

- **Internal to the Organization EEFs**:
  - **Organizational Culture, Structure, and Governance**. Project Vision, Mission, Values, Culture, Leadership Style, and Code of Ethics.
  - **Geographic Distribution of Facilities and Resources**. Project Locations, Virtual Teams, Shared Resources, and Cloud-Computing.
  - **Infrastructure**.
  - **Resources Capabilities and Availabilities**.
- **External to the Organization EEFs:**
  - Marketplace Competition, Recognition, and Trademarks.
  - Legal Restrictions. This composes mainly the Local Regulations related to Security, Data, Business Conduct, and Employment.
  - Governmental and Industrial Standards.



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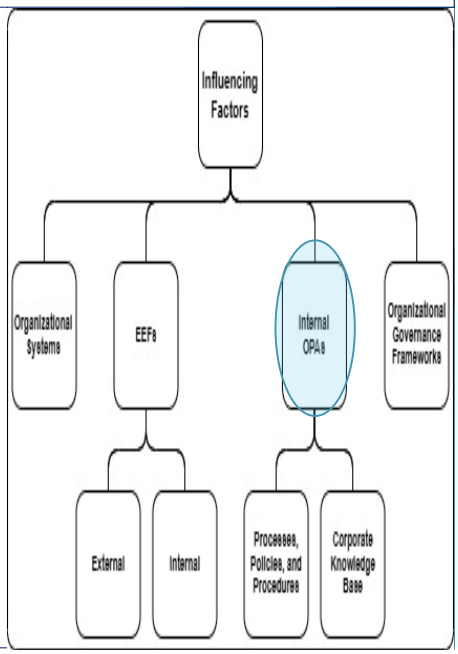
PROJECTS OPERATIONAL ENVIRONMENTS

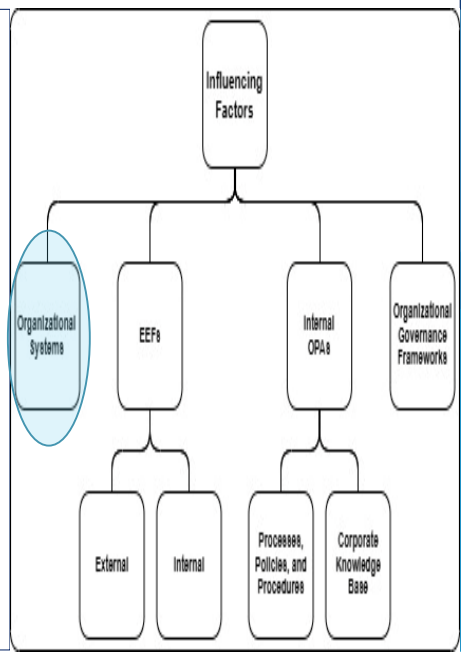
Organizational Process Assets Factors (OPAFs)

- OPAFs are Internal to the Organization itself.
- OPAFs come from the Organization's Portfolios, Programs, Projects, and/or Operations.
- OPAFs are classified into two sets of Environmental Influencing Factors:
  - **Processes, Policies, and Procedures**. The Organizational Processes, Policies, and Procedures for Managing the following:
    - Human Resources, Health and Safety, Security and Confidentiality, Quality, and Environment.
    - Organizational Procedures and Methods for Managing Projects, Estimation and Estimation Metrics, Audits, and Checklists.
    - Organizational Templates for Project Management Plans, Project Documents, Reports, Contracts, and Risk Management.
    - Organizational Procedures for Conducting Change Control.
  - **Organizational Knowledge Repositories**. The Databases of the Configuration Management, Financial, Historical, and Issues Management.



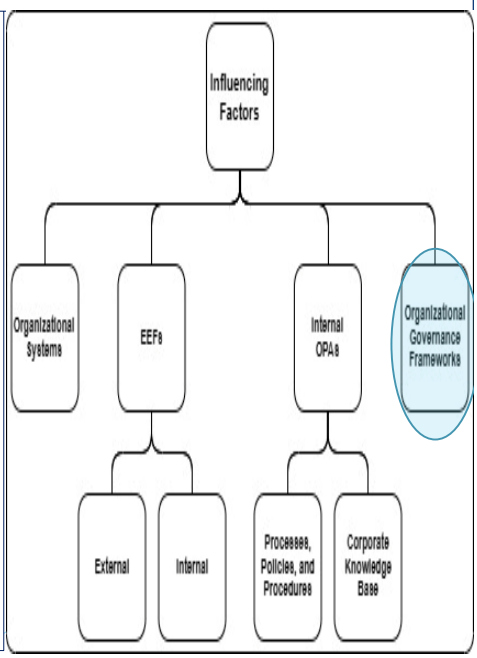
Organizational Systems-Related Factors (OSFs)

- OSFs impact the People's Ability to act within the Organizational System.
- OSFs include the People's Power, Influence, Interests, Competencies, and Political Capabilities.



Organizational Governance Frameworks-Related Factors (OGFFs)

- OGFFs are used to manage the Authority within the Organization.
- OGFFs include the Organizational Rules, Processes, Policies, Procedures, and Systems.
- OGFFs influence Projects in how to:
  - Set and achieve the Organization's Objectives in Alignment with their Organizational Objectives;
  - Monitor and assess the Organization's potential Risks; and
  - Optimize the Organization's Performance.



The Roles of Project Managers, Functional Managers, and Operational Managers

- **Project Manager Role**. A Project Manager is assigned by his/her Organization to lead a Team that will be responsible for carrying-on a Project to achieve its Objectives and Requirements.
- **Functional Manager Role**. A Functional Manager manages a Functional or a Business Unit.
- **Operational Manager Role**. An Operational Manager is responsible for ensuring that Business Operations go Smooth, Effective, and Efficient.

The PMI's Project Managers Talent Triangle

- **Technical Project Management Knowledge and Skills**

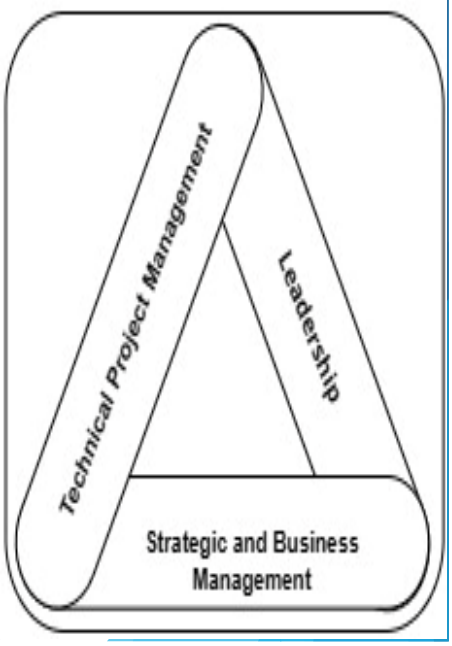
  This includes the Knowledge and Managerial and Technical Skills that are related to the specific Business domains of their Projects; and to the Project Management, Program Management, and Portfolio Management.

- **Leadership Knowledge and Skills**

  This includes the Knowledge and Skills needed to guide, motivate, and direct a Team.

- **Strategic and Business Management Knowledge and Skills**

  This includes the Knowledge and Expertise in the Business Industry to
  ensure the Enhancement of the Organization's Performance.



A Generic Classification of the Software Project Managers' Essential Skills

• **Ability to Organize and Manage**
  • Handle the Project Complexities;
  • Analyze the Project Artifacts;
  • Set the Project Goals, Scope, and Implementation Plan;
  • Plan for the Project Budget;
  • Staff for the Project Team;
  • Control and Solve Problems; and
  • Take Effective Actions.
	• **Ability to Cope and Lead**
	  • Handle CHANGE-REQUESTS;
	  • Set Directions;
	  • Provide Vision;
	  • Delegate Authority whenever there is a need for that;
	  • Be Positive and Energetic, Flexible, Creative, Patient, and Persistent throughout the Project Life-Cycle;
	  • Align People; and
	  • Take Meaningful Actions.

• **Ability to Communicate and Negotiate Effectively**
  • Communicate, Negotiate, and Make Decisions; and
  • Build Teams and deal with People.
	• **Hard and Soft Skills**
	  • Understand his/her own Organization as well as the Customer's Organization;
	  • Know enough about the targeted Product and/or Solution;
	  • Be well-Experienced in the Profession of Project Management and its relevant Technological Tools; and
	  • Be comfortable with handling CHANGE-REQUESTS.

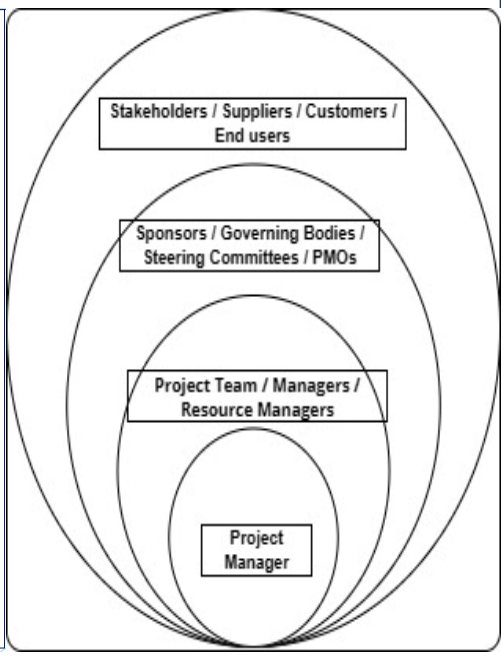
The Author's Classification of the Software Project Managers' Essential Skills

The Author classifies the Essential Skills for Software Project Managers as follows:

- **Project Management Skills**. This implies that a Software Project Manager must be well-knowledgeable and experienced in the various Project Management Principles, Methods, Processes, and Tools.
- **Software Project Domain-Specific Skills**. This implies that a Software Project Manager must be well-experienced in the domain of the Project he/she will be Managing.
- **Sociological Skills**. This implies that a Software Project Manager must be well-comfortable with the surrounding Humans Sociological Interactions, Behaviors, and Actions.
- **Psychological Skills**. This implies that a Software Project Manager must be well-comfortable with the surrounding Humans Psychological Views, and Actions.

Project Managers Circles of Influence

- **Layer #1**. This layer includes the Project Manager's Team Members that are directly influenced by him/her. Also, it includes the Peer-Managers, and the Resource-Managers such as the HR one.
- **Layer #2**. This layer includes the Project Sponsors, Governing Bodies, Steering Committee, and the PMO office.
- **Layer #3**. This layer includes the Project Stakeholders, Suppliers, Customers, and Users.



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PROJECT MANAGERS AND LEADERSHIP

Project Managers Leadership Styles

- **Laissez-Faire-Leadership-Style**. With this Leadership Style, a Project Manager allows his/her Team to make their own Decisions and establish their own Goals.
- **Transactional-Leadership-Style**. With this Leadership Style, a Project Manager focuses on the Project Goals, Feedback, and Accomplishments.
- **Servant-Leader-Leadership-Style**. With this Leadership Style, a Project Manager commits to serve other People by focusing on their Growth, Learning, Development, and Autonomy.
- **Transformational-Leadership-Style**. With this Leadership Style, a Project Manager empowers his/her Team through Idealized Behaviors, and Inspirational Motivation and Encouragement.
- **Charismatic-Leadership-Style**. With this Leadership Style, a Project Manager inspires his/her Teams by being High-Energetic, Self-Confident, and Enthusiastic.
- **Interactional-Leadership-Style**. With this Style of Leadership, the Project Manager should possess a combination of the Transactional, Transformational, and Charismatic Leadership Styles.

Another Classification of Project Managers Leadership Styles

- **Autocratic Leadership Style.** This Style is the same as Dictatorship. An Autocratic Project Manager is needed to handle Projects with Customers that have Autocratic Work Environments such as Military and Security Services. An Autocratic Customer would not give the Project Manager enough room for Discussion and Negotiation. The Customer issues instructions to the Project Manager who executes these instructions.
- **Bureaucratic Leadership Style.** This Style implies that a Software Project Manager and his/her Team are supposed to follow a set of predefined Processes, Procedures, Guidelines, and/or Regulations.
- **Charismatic Leadership Style.** This Style implies that a Software Project Manager acts in accordance with the situation he/she is going through. He/she must spread Hope and Enthusiasm among his/her Team; and encourage his/her Team to move forward.
- **Democratic Leadership Style.** This Style implies that all of the Software Project Team Members are encouraged to participate in the Decision Making Process, and that their Software Project Manager takes the Final Decision based on the Outcomes of the Team's Discussions and Suggestions.
- **Technocratic Leadership Style.** A Technocratic Leader is a Bureaucratic Leader, but he/she uses Technological Systems to quickly access the details of the needed Bylaws and Regulations. They also use the Decision Support Systems (DSS).

Generic Characteristics of the Project Managers' Personalities

Examples of the characteristics of the Project Managers Personalities are as follows:

- **Authentic.** An Authentic Project Manager accepts others for what and who they are.
- **Courteous.** A Courteous Project Manager applies appropriate Behaviors.
- **Creative.** A Creative Project Manager thinks abstractly, sees things differently, and innovates.
- **Cultural.** A Cultural Project Manager is sensitive to other Cultures including Values, Norms, and Beliefs.
- **Intellectual.** An Intellectual Project Manager deals with Human Intelligence in multi-Aptitudes.
- **Managerial.** A Managerial Project Manager considers Management Practices.
- **Political.** A Political Project Manager measures the Political Intelligence and make things happen.
- **Service-oriented.** A Service-oriented Project Manager is willing to serve other People.
- **Social.** A Social Project Manager understands and manages People.

A Generic Structure of a RFPs Document

- The **Project Information Section**: The Issuing Firm Label Sub-Section; The Issuing Firm Background Sub-Section; The Project Information Sub-Section; The Targeted Categories of Service-Providers Sub-Section; The Intuitive Budget and Budget Constraints Sub-Section; The Focal-Point of Contact Details Sub-Section; and so forth.
- The **Project Description Section**.
- The **Project Goals and Objectives Section**.
- The **Project Scope of Work Section**.
- The **Project Requirements, Terms and Conditions, and Constraints Section**: The Business and Technical Requirements; The Project Terms/Conditions/Constraints/Challenges/Risks/Threats; A Preliminary Architecture and Design of the Targeted Outcome; and The Project Targeted Outcomes, Deliverables, and Milestones.

A Generic Structure of a RFPs Document -2

- The Project Privacy, Confidentiality, None-Disclosure, and Intellectual Property Section.
- The Proposals Submission Guidelines Section.
- The Proposals Evaluation CRITERIA Section.
- The Required Service-Provider Details Section.
- The Service-Providers Qualifying CRITERIA Section.

Other Forms of Requests

- **Request for Information (RFI)**. This request form is usually sent out by the Customer to the pre-identified Service-Providers to request Information about their Products and Services. Such Information benefits the RFPs Development Process.
- **Request for Quotation (RFQ)**. This request form is used to only ask for Prices of certain Products (e.g., Equipment, Computers, Laptops, Software Solutions, and so forth.).
- **Request for Tender (RFT) or Invitation to Tender (ITT)**. This request form is similar to the Request for Proposals (RFPs), but it is used by Governmental Organizations.
- **Request for Qualifications (RFQ) or Pre-Qualification Questionnaire (PQQ)**. This request form is used to invite potential Service-Providers to complete a specific Questionnaire for the Purpose of becoming pre-Qualified Service-Providers in a specific Domain of Services.
- **Request for Association, Partnership, and/or Alliance**. This request form is used to build consortiums to jointly carry-on Large-Scale Projects.

Project Charters Structure

- The Project Vision Section.
- The Project Objectives Section.
- The Project Scope of Work Section.
- The Project Deliverables and Milestones Section.
- The Project Structure Section.
- The Project Proposed Implementation Plan Section.
- The Recommendations Section.
- The Approval/Disapproval Section.
- The Signatory Section.

The Initiation Phase and its Processes

The Author's View of the Initiation Phase Activities

- **At the Customer Side.** The Project Owner would carry-on the following Activities:
  - Identifying and analyzing the Business Requirements.
  - Reviewing the Organization's current Operations.
  - Conducting a High-Level Benefits Analysis.
  - Conducting a High-Level Budgeting.
  - Identifying the Stakeholders and their Expectations.
  - Developing a Request for Proposals (RFPs) that presents a High-Level of the Project Requirements, Terms and Conditions, Product's early Design, and so forth.
  - Sharing the RFPs with the Service-Providers.
- **At the Service-Provider Side:** Each Service-Provider would then carry-on the following Activities:
  - Developing a Project Charter that summarizes the Project Opportunity. This includes the Project Requirements, Terms and Conditions, Cost, Tasks, Deliverables, Milestones, and Schedules.
  - Conducting a SWOT Analysis to identify the Strengths and Weakness that would enable / disable the Service-Provider to carry-on the Project; and to identify the Opportunities and Threats.

The Initiation Phase and its Processes

The Author's View of the Initiation Phase Processes

- **INProcess#1 Initialization** - An idea of a new System is initially suggested.
- **INProcess#2 Endorsement**: If that idea is endorsed by the Customer, a Team of Experts will then carefully study it.
- **INProcess#3 RFPs Development**: The Team of Experts will carefully:
  - Study that idea and its surroundings;
  - Define the Customer's Objectives, Scope of Work, and Requirements; and
  - Put all of that into a Request for Proposals (RFPs) document.
- **INProcess#4 RFPs Announcement**: The Customer will then invite some of their pre-qualified Service-Providers to submit Proposals to carry-on the intended Project.
- **INProcess#5 RFPs Acquirement**: Interested Service-Providers will then obtain copies of the RFPs.
- **INProcess#6 RFPs Review**: Each interested Service-Provider will then review and evaluate the RFPs.
- **INProcess#7 SWOT Analysis**: Each interested Service-Provider will then identify the Strengths, Weaknesses, Opportunities, and Threats of the Project Opportunity that is presented in the RFPs.
- **INProcess#8 Project Charter Preparation**: Each interested Service-Provider will then develop a Project Charter that elaborates on the Project Objectives, Scope of Work, Requirements, Work Breakdown Structure (WBS), Deliverables and Milestones, Schedule, Resources, and Cost.
- **INProcess#9 Project Charter Presentation**: Each interested Service-Provider will then present the Project Charter to their Upper-Management to solicit their Approval.
- **INProcess#10 YES/NO Decision**: if the Upper-Management endorses the Project Charter, then they need to sign that Project Charter for Future Reference.

The Planning Phase and its Processes

The Author's View of the Planning Activities at the Service-Provider Side

- Define the Scope of Work for the new Project and identify its Requirements.
- Develop a Detailed Action Plan for the Project various Phases of Planning, Execution, Monitoring and Control, Quality Assurance and Control, Closure, and so forth.
- The Planning details are reached out by answering planning explicit as well as implicit questions (see next slide).

The Planning Phase and its Processes

The Author's View of the Planning Implicit Questions

• **The WHAT Questions** • WHAT is the Project Scope of Work? • WHAT are the Project Requirements? • WHAT are the Tasks for each Requirement? • WHAT are the Deliverables and Milestones?	• **The WHO Questions** • WHO should be the Project Manager? • WHO should be assigned to Task x?
• **The WHY Questions** • WHY should we have this Project?	• **The HOW Questions** • HOW should the Software Development be done? • HOW should the Project be managed? • HOW should the Testing cases be carried-on?
• **The WHEN Questions** • WHEN shall we start the Project? • WHEN shall we close the Project? • WHEN shall we start each of the Project Tasks and Activities? • WHEN shall we start the Project? • WHEN shall we close the Project? • WHEN shall we start each of the Project Tasks and Activities?	• **The WHERE Questions** • WHERE should the Software Development Environment be hosted? • WHERE should the Software Testing be hosted? • WHERE should the Software Operational be hosted? • WHERE should the Project Team Members be seated?

The Planning Phase and its Processes

The Author's View of the Planning Phase Activities at the Customer Side

- The Customer reviews, and evaluates the Proposals received from the Service-Providers, and then creates a short-list of the Service-Providers of the best Proposals (*e.g., 3-5 Proposals*).
- The Customer then invites each of the short-listed Service-Providers to present and discuss their Proposal.
- Each Service-Provider would then deliver a Presentation on their Proposal to the Customer and negotiate it with them.
- The Proposal Negotiation would involve:
  - The Project Scope of Work and Requirements, Work Breakdown Structure (WBS), Schedule, Resources Allocation; Resources Qualifications, and the proposed Solution;
  - The proposed Development and Management Methods;
  - The Terms and Conditions; and
  - The proposed Price.
- At the end of the Service-Providers' Presentations, the Customer would select the best Proposal and send a Letter of Awarding to their preferred Service-Provider.
- At the end of the Planning Phase, the Customer and the selected Service-Provider start the Project Contract Negotiation that involves the same items as in the Proposal Negotiation.
- A Final Version of the Contract is then signed by the representatives of the Customer and the Service-Provider.
- At this point, the Planning Phase is exited and the Execution Phase can be then started. .

The Planning Phase and its Processes

The Author's View of the Planning Phase Processes

- **PLProcess#1 Requirements Derivation**: Each interested Service-Provider conducts a detailed study of the RFPs to extract the Customer's Requirements.
- **PLProcess#2 Business and Technical Specifications Derivation**.
- **PLProcess#3 High-Level Design Derivation**..
- **PLProcess#4 Project Core Action Plan Derivation**: Each interested Service-Provider then derives a Project Core Action Plan that incorporates the Project Work Breakdown Structure (WBS), Schedule, Tasks Dependencies, Resource Allocation, and Deliverables and Milestones.
- **PLProcess#5 Complete Project Action Plan Derivation**: Each interested Service-Provider then adds to the Project Core Action Plan the needed Processes such as the Quality Assurance and Control Process, Risk Management Process, Team Building Management Process, Change Management Process, and so forth.
- **PLProcess#6 Proposal Derivation**.
- **PLProcess#7 Proposal Submission**.
- **PLProcess#8 Proposals Assessment and Shortlisting**.
- **PLProcess#9 Proposal Presentation and Negotiation**.
- **PLProcess#10 Letter of Awarding Issuance**.
- **PLProcess#11 Contract Negotiation**.
- **PLProcess#12 Contract Signatory**.

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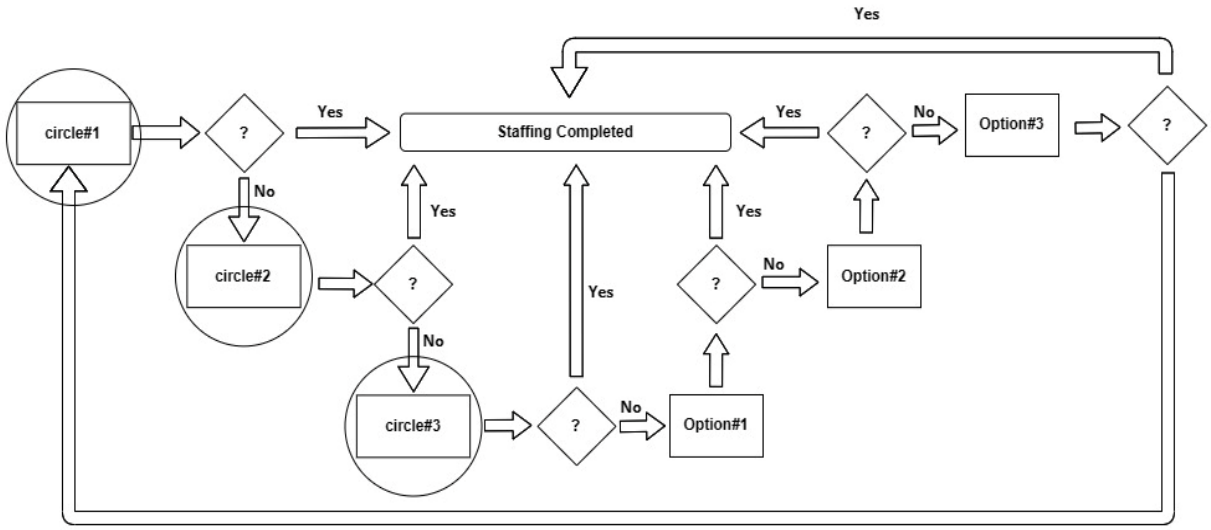
THE AUTHOR'S VIEW OF THE SPM PHASES AND THEIR PROCESSES

Dr. Radaideh's View of Staffing Circles and Options - Data Flowchart Diagram



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THE AUTHOR'S VIEW OF THE SPM PHASES AND THEIR PROCESSES

The Execution Phase and its Processes / The Author's View of the Execution Phase – Project Staffing

In-House Recruits. This represents the first stage of The Author's View of Project Staffing that composes three circles:	
Circle#1	A Project Manager attempts to hire staff from those who worked with them on previous Projects.
Circle#2	If Staffing remains incomplete, then the Project Manager seeks help from his/her colleague Project Managers to hire from those who worked with them on previous Projects.
Circle#3	If Staffing is still incomplete, then the Project Manager approaches the Human Resources Department at his/her company to get access to the profiles of all available Technical Staff to fill for as many left Roles as possible.
External Recruits. If there are still unfilled Roles, then the Project Manager shall go through the following three options for External-Recruits in sequence:	
Option#1	The Project Manager advertises the unfilled Roles searching for hirable independent External Staff Members. However, the Human Resources department should endorse hiring External Staff on full-time bases. Otherwise, the Project Manager will have to consider Option#2.
Option#2	The Project Manager would offer Contract-Based Employment to those who could not be hired on full-time bases in Option#1.
Option#3	If things do not work fine with Option#2, then the Project Manager approaches External Employment Agencies to get the needed staff.

The Execution Phase and its Processes

The Author's View of the Execution Phase Activities

At the beginning of the Execution Phase, the Project Manager should check the following items to ensure that the Contract is compliant with the RFPs:

- The Project Generic Description;
- The Project Objectives and Anticipated Outcomes;
- The Project Terms and Conditions, including the Service-Level-Agreement (SLA), if any;
- The Team Correspondence Process for both of the Horizontal and Vertical Communications;
- The Team Performance Evaluation Processes for both of the Project Manager and the Functional Manager;
- The Contract Management Processes for both of the Customer Contract Management, and the Service-Provider Contract Management;
- The sub-Contractors Management Process;
- The Change Management Process as proposed by the Service-Provider and accepted by the Customer;
- The Project Accounting Processes for both of the Customer Accounting, and the Service-Provider Accounting; and
- The Contract Governance and Compliance Process.

Then, the Project Manager must arrange for and take care of the following:

- Holding a Kick-off Meeting to start the Project;
- Handling the Logistical Arrangements and the Infrastructure Setup;
- Handling the Team Mobilization and Resource Allocations;
- Managing and Supervising the Execution of the Project Action Plan;
- Compiling the Progress and Monitoring Reports;
- Compiling the Accomplishments and Milestones Reports;
- Compiling the Issues and Risks Reports; and
- Compiling the Execution comprehensive Report.

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SE440 SOFTWARE PROJECT MANAGEMENT
THE AUTHOR'S VIEW OF THE SPM PHASES AND THEIR PROCESSES

The Execution Phase and its Processes

The Author's View of the Execution Phase Processes

- **EXProcess#1 Kick-off Meeting**.
- **EXProcess#2 Logistical Arrangements**.
- **EXProcess#3 Team Build/Mobilization/Management**.
- **EXProcess#4 Procurement and Sub-Contracting**.
- **EXProcess#5 Correspondence Management**.
- **EXProcess#6 Contract Management (Technical and Financial)**.
- **EXProcess#7 Tasks Execution**.
- **EXProcess#8 Change Management**.
- **EXProcess#9 Quality Assurance** (*e.g., MCProcess#1 Monitoring*).
- **EXProcess#10 Risk Management**.
- **EXProcesses#11-to-N all other Processes** that may be needed for the Project.

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The Monitoring and Control Phase and its Processes

The Author's View of the Monitoring and Control Phase Activities

During the Monitoring and Control Phase, many Monitoring Activities are carried-on such as the following:

- Assessing and measuring the ongoing Activities throughout the Project Life-Cycle.
- Monitoring the various Factors including the Project Cost, Effort, and Scope against its Plan and Performance Baseline.
- Identifying the Corrective Actions needed to resolve the Issues observed during the Measurement and Monitoring Activities.
- Establishing a Communication Channel to share and discuss Issues throughout the Project Life-Cycle.
- Establishing a Key Performance Indicators System (KPI) for the Project.
- Conducting Functional Testing to verify the Correctness and Preciseness of the various Functions, and Non-Functional Testing to test the Performance, Availability, Reliability, Scalability, Maintainability, and Testability of the targeted Solution.

The Monitoring and Control Phase and its Processes

The Author's View of the Monitoring and Control Phase Processes

- **MCProcess#1 Assessing the Ongoing Project Activities - Monitoring and Quality Assurance** (*e.g.*, *EXProcess#9 Quality Assurance*).
- **MCProcess#2 Testing the Product Operation Factors** including the Correctness, Reliability, Efficiency, Integrity, and Usability.
- **MCProcess#3 Testing the Product Revision Factors** including the Maintainability, Testability, and Flexibility.
- **MCProcess#4 Testing the Product Transition Factors** including the Portability, Reusability, and Interoperability.
- **MCProcess#5 Monitoring the Project Variables** including the Cost, Effort, Scope, Schedule, and Resources against the Project targeted Performance Baseline.
- **MCProcess#6 Identifying Necessary Corrective Actions** to resolve and fix any Issue that arose during the Testing.
- **MCProcess#7 Managing Changes**.

The Closure Phase and its Processes

The Author's View of the Closure Phase Activities

The Project Closure Phase involves the following Activities:

- A Post-Implementation Review. Reviewing things that succeeded and analyzing things that went the other way to come up with Lessons Learned.
- Closure of the Project Contacts. Complete all Contracts related to the Project.
- The Project Closure. Complete all Activities across all Groups of Processes throughout the Project Life-Cycle.

The Closure Phase and its Processes

The Author's View of the Closure Phase Processes

- **CLProcess#1 Checklist Preparation**.
- **CLProcess#2 Deliverables Handover**.
- **CLProcess#3 Customer's Users Training**.
- **CLProcess#4 Warranty Management**.
- **CLProcess#5 Financial Settlement**.
- **CLProcess#6 Project Signoff**.

Types of Contracts

a) Sales Contracts:

A Sales Contract composes several sections such as:

- The details of the involved Parties,
- The list of Products, Solutions, and/or Services that the representative will be authorized to sell out,
- The selling Prices,
- The Territory throughout which the representative can operate,
- The Promotional Discounts, and
- The Commission Percentage that the representative will receive when he/she closes a deal.

A Sales Contract can be with a Sales representative or a Sales Agency:

- **Sales representative Contracts**. By signing this type of Contracts, a Sales representative agrees to promote and sell the Products to the Customers, and then gets paid a base Salary plus Sales Commission.
- **Agency (Agent) Contract Agreements**. By signing this type of Contracts, an Agency agrees to promote and sell a predefined list of Products on behalf of the Seller to Customers in a pre-determined region and for predefined Prices, and then gets paid a percentage of these Sales.

Types of Contracts

b) Purchasing Contracts

- A Purchasing Contract is a Contract between a Customer (e.g., a Buyer) and a Service-Provider (e.g., a Seller) that is promising to sell Products, Solutions, and/or Services in accordance with a set of Terms and Conditions.
- The Customer is required to acknowledge the reception of these Products, Solutions, and/or Services and pay for them.

c) Performance-Based Contracts

- A Performance-Based Contract is judged by the Performance of its Products, Solutions, and/or Services. In other words:
  - Performance is in Full-Compliance with the Customer's predefined Performance Expectations ➔ Service-Provider gets paid the same agreed-upon amount of Money.
  - Performance is behind the Customer's Expectations ➔ Customer rejects the outcomes ➔ Service-Provider gets paid no or less Money.
  - Performance exceeds the Customer's Expectations ➔ Service-Provider gets paid more Mony.

Types of Contracts

d) Partnership Agreements

- A Partnership Agreement is a Contract that establishes the Terms for a Partnership between at least two Parties.

e) Sub-Contractor Contracts

- A Sub-Contractor is an individual or a Business that is hired by a Prime-Contractor to carry-on part of the work that is defined in their Contract with their Customer. The Incentive to hire a Sub-Contractor is either to reduce the Project Cost, improve its Quality, or mitigate its Risks. A Sub-Contractor can be of one of the following categories:
  - **Domestic and Interdisciplinary Sub-Contractors**.
  - **Nominated Sub-Contractors**.
  - **Named Sub-Contractors**.

Contract Management Phases

- **The Pre-Contract Phase**. During this Contract Management Phase, the Project Contract is planned for, articulated, and then endorsed and signed by the its Parties.
- In Terms of Project Management, this Contract Management Phase is lined-up with the Project Management Phases of Initiation, and Planning.
- **The Contract Execution Phase**. During this Contract Management Phase, the Project Execution, Monitoring and Control, and Closure Phases' Activities are carried-on.
- In Terms of Project Management, this Contract Management Phase is lined-up with the Project Management Phases of Execution, Monitoring and Control, and Closure.
- **The Contract Post-Execution Phase**. During this Contract Management Phase, the Contract is checked to ensure its Compliance with its Governing Standards, and to ensure having adequate Support to the delivered Products Solutions, and/or Services.
- In Terms of Project Management, this Contract Management Phase is lined-up with the Project Management Phases of Monitoring and Control, and Closure. Also, it is lined-up with the additional Project Management Phase of Support (*e.g., either as an additional Phase to the five Phases of Project Management, or as a separate Support Contract*).

THE AUTHOR'S SIMPLIFIED CHANGE MANAGEMENT PROCESS

The Change Management Process is a Process for dealing with CHANGE-REQUESTS received throughout the Project Life-Cycle. The types of CHANGE-REQUESTS are as follows:

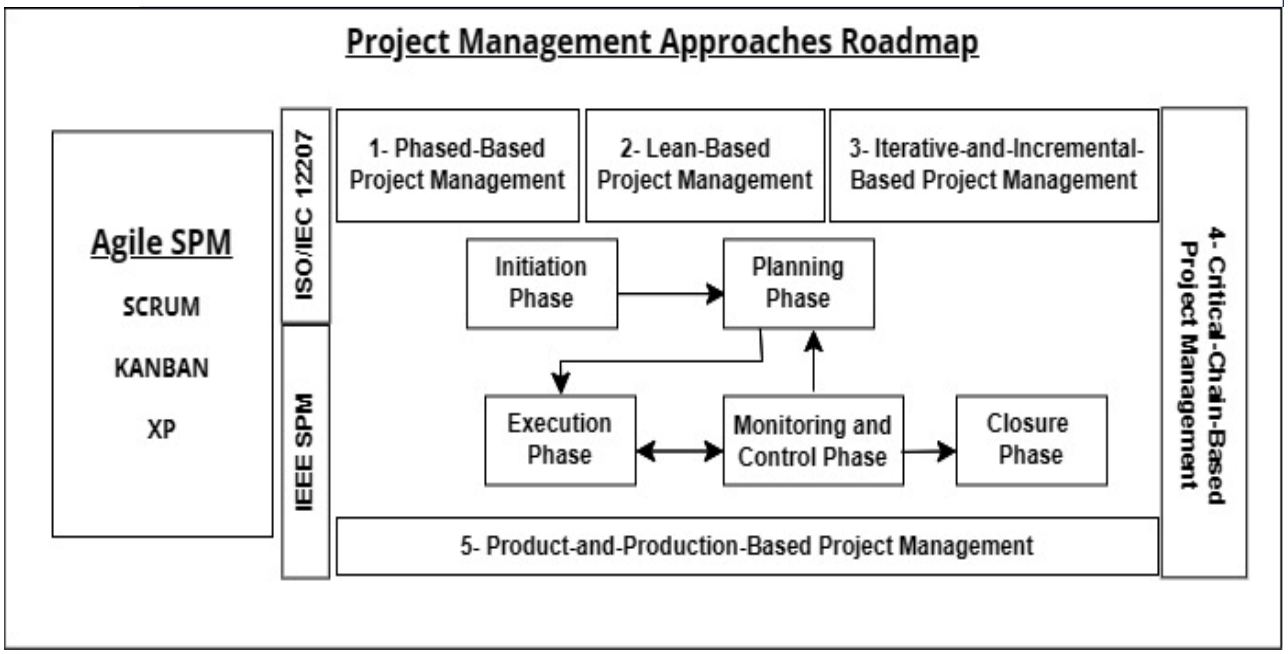
- CHANGE-REQUESTS Received from the Customer.
- CHANGE-REQUESTS Received from the Project Team.
- CHANGE-REQUESTS Received from the Project Accountant.

THE AUTHOR'S SIMPLIFIED RISK MANAGEMENT PROCESS

The Author's Simplified Risk Management Process goes through the following steps:

- **Step#1: Risks Identification**. This step is to identify all potential Risks and Threats and their anticipated Impacts along with the Probabilities of their potential Occurrences.
- **Step#2: Risks Classification**. This step is to classify the identified potential Risks into three Categories, which are the Risks with Low-Impacts Category, Risks with Moderate-Impacts Category, and Risks with High-Impacts Category.
- **Step#3: Responses to Risks**. In reference to Table 2.20, Risks can be dealt with as follows:
  - In the case of Low-Impact Risks, all what is needed is proactively identify these Risks. However, if it happens that a Low-Impact Risk occurs during the Project Life-Cycle, then the Project Manager should reactively devise a Plan and immediately implement it to counterpart that Risk.
  - In the case of Moderate-Impact Risks, all what is needed is proactively identify and plan for these Risks. However, if it happens that a Moderate-Impact Risk occurs during the Project Life-Cycle, then the Project Manager should reactively implement the pre-prepared Plan to counterpart that Risk.
  - In the case of High-Impact Risks, all what is needed is proactively identify, plan for encountering these Risks, then immediately implement these Plans.

Category	Identify	Plan	Implement
Low-Impact Risks	Proactively	Reactively	Reactively
Moderate-Impact Risks	Proactively	Proactively	Reactively
High-Impact Risks	Proactively	Proactively	Proactively



SE440 SOFTWARE PROJECT MANAGEMENT
PROJECT MANAGEMENT APPROACHES

1- Phase-Based Project Management (PBPM)

The PBPM Approach carries on the Project predefined work through the following five Phases:

- **Initiation Phase**. This stage is meant to:
  - Initiate the Project Idea; and
  - Intuitively define the Project Objectives, Scope of Work, Requirements, Milestones, and Deliverables.
- **Planning Phase**. This stage is meant to:
  - Extract the Project Objectives, Scope, Requirements, Deliverables, and Milestones from the RFPs;
  - Estimate the Project Tasks, Activities, Work Breakdown Structure (WBS), and Schedule;
  - Allocate Resources; and
  - Devise a preliminary Design for the targeted Products, Solutions, and/or Services.
- **Execution Phase**. This stage is meant to:
  - Carry-on the Tasks and Activities according to the Work Breakdown Structure (WBS); and
  - Build and Construct the targeted Products, Solutions, and/or Services.
- **Monitoring and Control Phase**. This stage is meant to carry-on a predefined set of Quality Assurance and Quality Control Tasks and Activities.
- **Closure Phase**. This stage is meant to carry-on a predefined set of Tasks and Activities needed to Complete and Close the Project.

2- Lean-Based Project Management (LBPM)

- The LBPM Approach is a variation from the PBPM one. Although it goes through the same five Phases of the PBPM Approach, it is meant to produce Deliverables in less times, and with less waste by RE-CYCLING Components from previous Products, Solutions, and/or Services.

3- Iterative-Incremental-Based Project Management (IIBPM)

- The PBPM Approach is not suitable for Large-Size Projects with Fast-Changing Requirements that are not clearly predefined. It is not suitable as well for Projects that have much Risks, Uncertainties, and/or Dependencies. Several IIBPM Methods have evolved to handle such Complexities. It is important to notice that the IIBPM Methods are considered part of the Agile Methods.

4- CRITICAL-CHAIN-Based Project Management (CCBPM)

- The CCBPM Approach is designed to deal with the Uncertainties in Managing Projects such as having limited Availability of the needed Human Resources and/or Physical Resources. Constrained Tasks and Activities are given Higher Priorities during the Project Planning, Resource Allocation, and Execution.

5- Product-and-Production-Based Project Management (PPBPM)

- The PPBPM Approach is a Structured Project Management Approach that identifies the Project targeted Products; and then produces the targeted Outcome Products, Solutions, and/or Services using the materialized and informational Inputs at a predefined Production Volume for each of these Outcomes.

The 4 Pillars of Project Management (Author's Extended View, instead of 3 Pillars)

ON-TIME	This pillar refers to Completing the Project On-Time in accordance with its predefined Schedule.
WINTHIN-BUDGET	This pillar refers to Completing the Project without exceeding the pre-allocated Budget. In other words, its overall spendeture should not exceed that Budget.
MEET-SPECS	This pillar refers to Completing the Project with its Outcome Product's Specifications meeting the Project predefined Specifications. In other words, the Specifications of the Project Outcomes should be Compliant with its Governing Baseline Specifications.
SATISFY-CUSTOMER	This pillar refers to having the Customer to accept the Project Deliverables. In other words, the Deliverables should pass the Customer Testing and ACCEPTANCE-CRITERIA.

Projects Success Factors-1

1. **Definitions**. This refers to the necessity of having the Project Goals, Scope, and Requirements well-defined before the Project starts.
2. **Upper Management Support**. For a Project to succeed, it is Essential to have a High-Level of Support from the Upper-Management at both sides of the Customer and the Service-Provider. Also, it is Essential to have Support from the Project Stakeholders and Shareholders.
3. **User Involvement**. It is Essential to involve the End-Users from the Customer side as early as possible in the Project Life-Cycle.

Projects Success Factors-2

4. **Project Manager Competency. The Project Manager must be Competent in terms of:**
   - **Being a Professional Project Manager**. He/she must be very-well Experienced in Project Management.
   - **Having Adequate Knowledge of the Project Subject Domain**. For Example, if the Project involves Telecommunications, then the Project Manager should have adequate Knowledge and Experience in the domain of Telecommunications.
   - **Being Able to Handle Sociological and Psychological Issues**. The Project Manager must be able to handle any Sociological and/or Psychological Issues that may arise among the Project Team or while dealing with the Customer's representative throughout the Project Life-Cycle.
   - **Having Technological Skills**. The Project Manager must be able to use and utilize the necessary Technological Tools to plan for and track the Project Execution.
   - **Being Able to Manage**. The Project Manager must be able to handle any complexity in the Project, devise a reasonable Budget for the Project, build and manage the Project Team, control and solve Problems that may arise during the Project Life-Cycle, and take Effective Actions and Decisions.
   - **Being Able to Lead**. The Project Manager must be able to handle and promote changes; give Directions and provide Vision; align the Team Members in a way that would prevent any inter-Team Conflicts; motivate and inspire the Team Members; take Meaningful Actions; delegate Authority whenever that is necessary; remain Positive, Energetic, Flexible, Creative, Persistent, and Patient throughout the Project Life-Cycle; and conduct careful Planning and Analysis for the Project.

Projects Success Factors-3

5. **Work Breakdown Structure, Schedule, and Resource Allocations**. As part of the Planning Phase, the Project Manager must be able to transform the Requirements into lists of Tasks and Activities, such that each list belongs to one Requirement.
6. **Deliverables and Milestones**. As part of the Planning Phase, the Project Manager should find out the required Deliverables that should be handed over to the Customer throughout or/and at the end of the Project. Also, he/she should devise a set of Milestones to monitor and watch the Achievements of the Project Strategic Objectives throughout the Project Life-Cycle.
7. **Needed Processes**. As part of the Planning for the Project Detailed Action Plan, the Project Manager should identify the list of Processes that must be used throughout the Project Life-Cycle. Together with the Project Core Action Plan (*e.g., Work Breakdown Structure (WBS), Schedule, inter-Tasks Dependencies, Resource Allocations, Deliverables, and Milestones*), these Processes compose the Project Detailed Action Plan.
8. **Project Team Quality**. As part of the Resource Allocations Activities, the Project Manager should select the right Resources to be assigned to work on his/her Project.

Projects Success Factors-4

9. **Resources Availability**. If Resources with the needed Competencies are not available in the Local Market, then the Project Manager will face hard Times while Staffing for his/her Project.
10. **TEST-CASES Quality and Comprehensiveness**. In Collaboration with the Project Team and the Project Quality Assurance Officer, the Project Manager should devise a set of TEST-CASES that is comprehensive and leads to High-Coverage of the Solution's Functions (*e.g., Black-Box TEST-CASES as well as White-Box TEST-CASES for both Functional and Non-Functional TEST-CASES*).
11. **Users Training Quality and Comprehensiveness**. During the Closure Phase, the Project Manager should facilitate an adequate set of Training Sessions for the End-Users at the Customer's side.
12. **Estimations Accuracy**. The Project Manager should do the best he/she can to secure Correctness and Preciseness when he/she estimates for Tasks; Schedule; and Resource Allocations.

The Journey from Practices to Standards goes through the following steps:

- **Step #1**: A large set of Generic Practices is identified.
- **Step #2**: The large set is then narrowed down to a sub-set of Practices that can be refer to as BEST-PRACTICES. A Practice can be identified as a Best-Practice based on the Reputation of the Project Manager who used that Practice to carry-on his/her Projects with Positive Impacts on his/her Customers.
- **Step #3**: The BEST-PRACTICES are then tried for few years with many real Projects, and based on the Feedback from their Project Managers, these BEST-PRACTICES would diverge into one or more Enhanced-Practice(s). Each Enhanced-Practice can then be referred to as a Defacto.
- **Step #4**: A Defacto is then tried for many years with many real Projects, and based on the Feedback from their Project Managers, that Defacto can be announced as a Ready-for-Standardization Defacto.
- **Step #5**: The concerned Organization can then initiate the Standardization Process with the concerned Standardization Authority (*e.g., ISO, IEEE, and so forth*) to standardize their Ready-for-Standardization Defacto.
- **Step #6**: The concerned Standardization Authority then reviews the submitted Defacto, adjusts it if necessary in coordination with the owning Organization, arranges to use it with additional real Projects if needed, discusses it carefully and thoroughly until a solid conclusion is reached before that Defacto is declared officially as a new Standard.