Project Integration Management

The knowledge area exclusively for the Project Manager

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Project Integration management is the knowledge area exclusively for the use of project managers. All of us know that the project managers are also called as integrators. The project integration includes the processes and activities needed to identify, define, combine, unify, & coordinate the various processes & project management activities within the project management process groups. This Includes characteristic of unification, consolidation, articulation & integrative actions that are crucial to project's successful completion.

In an organization there will be people designated for managing different knowledge areas of the project. For example to manage scope and collector gather or elicit requirements there will be designated business analysts in consultation with the project manager. To manage time there can be a separate department for scheduling. Similarly there can be a quality department and a quality manager. Risk manager to manage risk. Human resource manager, communication manager and procurement manager to manage their respective areas. But ultimately it is the responsibility of the project manager to coordinate with these officials and to integrate all these functions towards the successful completion of the project within the scope, budget and on time. That is Integration Management.

Therefore this knowledge area is Primarily concerned with effectively integrating the processes in all other project knowledge areas like, scope, time, cost, quality, human resource, communication, risk, procurement and stakeholder management within the project management process groups. And these are required to accomplish project objectives within an organization's defined procedures and achieving customer satisfaction. Which intern requires ongoing communication with the customer to keep the customer informed about the progress of the project time to time and to determine whether expectations have changed or achieved until the successful closing of the project. The approach will be different depending upon the (Predictive, Iterative or Agile) project life cycle.

First process in this knowledge area is to Develop Project Charter, which comes under initiation process group. There are only two processes in initiation process groups. The other process comes in the initiation process group is "identify stake holders" which is coming under the stakeholder management knowledge area.

The project charter is the document that formally authorizes a project, and provides the project manager with the authority to apply organizational resources to the project activities. The key benefit is a well-defined project start and project boundaries, creation of a formal record of the project & a direct way for senior management to formally accept and commit to the project.

Develop Project Charter: Inputs

1. Project Statement of Work (SOW): A written description of the deliverables supplied by the project. Given by the customer (mostly with the help of a business analyst). It references the following. Business Need, Product Scope Description and Strategic Plan.

2. Business Case: describes the necessary information from a business standpoint to determine whether or not the project is worth investment and reasons to undertake this project to produce a product or service and its value addition to the organization. It's usually a result of one of the following:

    - Market Demand
    - Organizational Need
    - Customer Request
    - Technological Advance
    - Legal Requirement
    - Ecological Impact
    - Social Need

3. Agreements: contracts, Service Level Agreements (SLA), letter of agreements, letter of intents, etc.

4. Enterprise Environmental Factors (EEF): EEF are the internal and external factors effecting the organization such as internal politics for power and authority and external political changes may have good or bad effects to the organization, foreign exchange will be decisive factor for the projects undertaken through out-sourcing from foreign countries. Economic Stability of the organisation and the country example recession may affect the business and so on.

5. Organizational Process Assets (OPA): OPA are the knowledge base achieved in the organization such as lessons learned, templates and forms used to carry out different processed, technology adopted by the organization, policies and procedures followed in the organization. Best Practises followed to carry out projects and programs.

Develop Project Charter: T & T (Tools & Techniques)

1. Expert Judgment, get advice from knowledgeable and experiences persons (groups) from many sources including:
    a. Other units within the organization
    b. Consultants

c. Different Stakeholders (including the customer)
d. Professional and technical associations
e. Industry groups
f. Subject Matter Experts
g. Project Management Office

2. Facilitation Techniques (brain storming, meeting management, conflict resolution etc.,)

Develop Project Charter: Outputs

Project Charter, usually includes

1. Project Purpose/Justification
2. Measurable Project Objectives
3. High-level requirements
4. Assumptions and Constraints
5. High level project description and boundaries
6. High level Risks
7. Summary budget & milestones
8. Initial Stakeholder List
9. Project Approval Requirements
10. Assigned Project Manager
11. Name and Authority of the sponsor

Project Charter involves the sponsor and customer as a partner in the successful outcome of the project through active participation during the project. A sample project charter can be downloaded from the link: http://www.projectmanagementdocs.com/initiating-process-group/project-charter-long.html

Develop Project Management Plan

The Second process in this knowledge area is to Develop Project Management Plan. Obviously it comes under the planning process group and this is the process of defining, preparing, coordinating and integrating all subsidiary plans. The key benefit is that the Project Management Plan is a central document that defines the basis of all project work. Project Plan defines how the project will be executed, monitored and controlled, and closed.

Planning and communication are critical to successful project management. They prevent problems from occurring or minimize their impact on the achievement of the project objective when they do occur. The more you plan the more money you save. The Project Management plan contains all subsidiary plans generated from other Project knowledge areas, Project methodologies and Base lines (Scope, Schedule & Cost).

Develop Project Management Plan: Inputs

1. Project Charter
2. Outputs from other planning processes (All subsidiary plans and base lines).
3. Enterprise Environmental Factors (internal and external factors effecting the organization)
4. Organization Process Assets (All formats and templates, lessons learned, historical information etc.)

Develop Project Management Plan: T & T (Tools & Techniques)

1. Expert Judgment from knowledgeable and experienced persons (groups).
2. Facilitation Techniques (brain storming, meeting management, conflict resolution etc.,)

Develop Project Management Plan: Output

Project Management Plan includes

- Scope Baseline (Approved scope statement, Work Break Down Structure(WBS) & WBS Dictionary)
- Schedule baseline (Approved Schedule)
- Cost Baseline (Approved Budget)
- Scope Management Plan
- Requirements Management Plan
- Cost Management Plan
- Quality Management Plan
- HR management Plan
- Communication Plan
- Stakeholder Management Plan
- Risk Management Plan
- Procurement Plan
- Process Improvement Plan
- Methodologies (The methodology would contain project life cycle approach such as adaptive, incremental or agile and sections for project scope definition, planning, scheduling, and monitoring and control. There would also be a section on the role of the project manager, line managers, and executive sponsors. To make the project management methodology easy to use and adaptable to all projects, the methodology would be constructed using forms, guidelines, templates, and check- lists rather than the more rigid policies and procedures.)

Taking the time to develop a well thought-out plan before the start of the project is critical to the successful accomplishment of any project. A project must have a clear objective of what is to be accomplished and defined in terms of end product or deliverable, schedule, and budget; and is agreed upon by the customer. A sample Project management plan can be downloaded from the link: http://www.projectmanagementdocs.com/project-planning-templates/project-management-plan.html

Direct & Manage Project Work

The Third Process in the Integration management knowledge area is to Direct and Manage Project Work, which comes under execution process group. The process of performing the work defined in the project plan to achieve the project's objectives. It includes but is not limited to:

- Perform activities to accomplish requirements
- Create project deliverables
- Staff, train & manage project team members
- Establish and manage project communication channels
- Generate project data (e.g. cost, schedule, technical and quality progress)
- Issue change requests
- Manage risks
- Manage sellers and suppliers

Direct and Manage Project Work also required review of the impact of all project changes and the implementation of approved changes for the following reasons:

- Corrective action: to realign the performance of the project work to the project plan.
- Preventive action: to ensure future performance to align with project plan
- Defect repair: to modify a non-conforming deliverable

Direct & Manage Project Work: Inputs

1. Project Management Plan (Including all subsidiary plans and baselines)
2. Approved Change Requests (approved by the change control board output of perform integrated change control process)
3. Enterprise Environmental Factors
4. Organization Process Assets

Direct & Manage Project Work: T & T (Tools & Techniques)

1. Expert Judgment (expert opinions on execution of the project plan)

2. Project Management Information Systems (can be considered as a software where all sorts of project records could be accommodated and retrieved)
3. Meetings (expert opinions' are gathered in a meeting)

Direct & Manage Project Work: Output

1 Deliverables (Deliverable are a unique and verifiable product, result, or capability to perform a service that is required to be produced to complete a process, phase or project.)
2 Work Performance Data, includes
- Schedule progress showing status information (Actual progress)
- Which Deliverables are completed and which are not.
- Extent to which quality standards are met.
- Costs authorized and incurred.
- Lessons learned.
- Resource utilization detail.

3 Change Requests (raised for corrective actions, preventive actions, defect repair and updates)
4 Project Management Plan updates with the result of changes.
5 Project Documents Updates (Requirements document, project logs, risk register, stakeholder register etc. project documents are not subsidiary project plans)

Monitor & Control Project Work

The Fourth process in this knowledge area is to monitor and Control Project Work, as the name implies it comes under the monitor and control process group, here we are tracking, reviewing, and reporting the progress to meet the performance objectives. Corrective and preventive actions are taken to control the project performance to resolve/prevent deviation between project results and project plan.

- Compares actual project performance against the project management plan.
- Assesses performance to decide whether any corrective or preventive actions are needed
- Analyzes, tracks, and monitors project risk.
- Maintains accurate and timely information on the project's deliverables(s).
- Provides cost and schedule forecasts.
- Monitors the implementation of approved changes as and when they occur.

The key to effective project control is measuring actual progress and comparing it to planned progress on a timely and regular basis and taking any needed corrective action immediately through Perform Integrated Change Control. Intense competition in the market makes even small missteps costly in most industries.

Monitor & Control Project Work: Inputs

1. Project Management Plan(Including all subsidiary plans and baselines)
2. Schedule Forecasts (Estimate To Complete)
3. Cost Forecasts (Estimate at Completion, BAC)
4. Validated Change Requests (including corrective and/or preventive actions and defect repair)
5. Work Performance Information (while comparing actual with planned value SPI, CPI, CV, SV, etc.)
6. Enterprise Environmental Factors (Government or industry standards, work authorization system, stakeholder's risk tolerances, etc.)
7. Organizational Process Assets (Organizational knowledge base)

Monitor & Control Project Work: T & T (Tools & Techniques)

1. Analytical Techniques to find out variances, forecasting and root cause analysis.

    - Regression Analysis (Statistical process for estimation of relationship among variables for e.g... Salaries of employees and their experience and education etc., are inputted to the software and relationships and dependencies are identified to place them properly)
    - Causal Analysis & Root Cause Analysis using cause and effect diagram.
    - Forecasting methods (time series, scenario building, etc. A fancier term for assumption is "scenario". Scenario implies a series of assumptions that are being considered to create a forecast for strategic planning.)
    - Fault tree analysis (FTA) (safety analysis technique that has been used in product line engineering using some tools to eliminate design weaknesses in a product)
    - Failure mode and effect analysis (FMEA) (is a disciplined procedure that recognizes and evaluate to analyze the potential and actual effect of failure of a product or process and intensify action that reduce the chances of a potential failure)
    - Earned Value Management (Earned value management is a project management technique for measuring project performance and progress. It has the ability to combine measurements of the Scope, time and cost)
    - Variance Analysis (Schedule Variance = Earned Value-Planned Value or Cost Variance =Earned Value –Actual Cost etc.,)

- Forecasting methods (Estimate To Complete=Estimate At Completion-Actual Cost)
- Trend Analysis (is a mathematical technique that uses historical results to predict future outcome. This is achieved by tracking variances in cost and schedule performance.)
- Reserve Analysis (contingency reserve analysis to meet known risk & Management reserve analysis to meet unknown risk)

2. Expert Judgment
3. Project Management Information Systems (can be considered as a software where all sorts of project records could be accommodated and retrieved)
4. Meetings

Monitor & Control Project Work: Output

1. Change Requests (generated when the execution is not in accordance with the plan)
2. Work Performance Reports (Hard copy or electronic copy of the work performance information on project performance to take decision, work performance information is obtained when the actual work performed is compared with the planned work)
3. Project Management Plan Updates (with the changes in scope, time & cost etc.)
4. Project Documents Updates (Schedule forecasts, cost forecasts and work performance reports getting updated)

Perform Integrated Change Control

The fifth process in this knowledge area is to Perform Integrated Change Control, which comes under the monitor and control process group. This is the process of reviewing all change requests (there are 17 processes gives change request as output), approving or rejecting changes & managing changes to the deliverables, organizational process assets, project documents & the project management plan.

Sponsor/Project Manager/Change Control Board (CCB) is responsible for approving or rejecting change requests. Roles and responsibilities of CCB are defined within configuration control and change control procedure. This process is not at all required if there is no change in the project plan, which is mostly impossible in many of the projects.

Configuration control is defined as the identification and documentation of the functional and physical characteristics of a product, service or result whereas change control deals with the changes to the project documents, deliverables or baseline.

Perform Integrated Change Control: Input

1. Project Management Plan (one of the most important content of the project management plan is the change management plan which constitute the change control processes)
2. Work Performance Reports (Hard copy of the work performance information, cost, schedule and earned value reports)
3. Change Requests (All change requests are accepted or rejected through this process)
4. Enterprise Environmental Factors
5. Organizational Process Assets (configuration management knowledge base and change control system followed)

Perform Integrated Change Control: T & T (Tools & Techniques)

1. Expert Judgment (Opinion from subject matter experts, consultants, stakeholders, PMO)
2. Meetings (Changes requested are reviewed in a meeting and approved or rejected)
3. Change Control Tools (Changes has to track, control and bring back to normal as per plan using the help of manual or automated tools)

Perform Integrated Change Control: Output

1. Approved/Rejected Change Requests
2. Change Log (Documented changes to manage changes to the deliverables)
3. Project Management Plan Updates
4. Project Documents Updates

Close Project

The last and sixth process in this knowledge area is close Project which comes in the closing process group. This process deals with the process of finalizing all activities across all of the project management process groups to formally close the project or phase. Provide lessons learned, formal ending of project work and release of organization resources to pursue new endeavors. After the conclusion of a project, the **project performance** should be evaluated to learn what could be improved if a similar project were to be undertaken in the future. **Feedback** should be obtained from the sponsor or customer and the project team.)

Close Project: Inputs

1. Project Management Plan (to compare the scope baseline with the actual deliverables)

2. Accepted Deliverables (Deliverables accepted by the customer in the scope validation process)
3. Organizational Process Assets (lessons learned, project documents, Acceptance records, etc.)

Close Project: T & T (Tools & Techniques)

1. Expert Judgment (Expertise is available from PMO, professionals etc.)
2. Analytical Techniques (Regression analysis and trend analysis etc., are used)
3. Meetings (Lessons learned and close out procedures are discussed)

Close Project: Outputs

1. Final Product, Service, or Result Transition
2. Organizational Process Assets Updates (Project files, closure documents, historical information, etc.)

A brief road map of Integration for better understanding

In the Integration management, project is initiated with a project charter. Project manager is assigned. Stake holders are identified and a project management plan is developed considering all planning processes of other project knowledge areas such as scope, time, cost, quality, human resource, communication, risk, procurement and stakeholder management. After the above project plan is approved the project will be executed as per the plan through direct & manage Project work processes. If the things are going as per the plan, deliverables are produced and forwarded as input to internal checking to quality control process.

Once the deliverables are verified through this process and found correct (QC Passed). The verified deliverables will go as input to the scope validation process by the customer. Or else a change request is raised by the quality control department (Internal failure is always better than external failure). If the deliverables are accepted by the customer, during the scope validation process, then these accepted deliverables will be passed as input to closing process;or else a change request is raised by the customer (this external failure costs heavily, it can damage the reputation of the company and lost business, liabilities like arbitration, litigation, warranty replacements or re-work etc.,). All the change requests have to be passed through integrated change control process for approval or rejection.

If the execution is not going as per the plan then also the change request has to be raised, (there are 17 processes out of 47 processes which are raising such change requests in PMBOK), and these change requests will be passed through the process called perform integrated change control. The changes will be rejected or accepted through this process. Once the changes are accepted, the changes requests will again go as input to the process called direct and manage project work. Then as an output of direct and manage project work deliverables are produced, or some corrective/preventive action is taken place on the deliverables or defect

repairing is done on the deliverables. These deliverables will be again forwarded as input to the quality control process.

If it is OK, then the verified deliverables will be forwarded as input to the scope validation process, and if the customer is satisfied with verified deliverables, those deliverables will be accepted. The accepted deliverables pass as input to the closing process. This cyclic process will be repeated until all the deliverables are accepted by the customer.

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