University of Malaya

Course Title :

Software Development Management
(WXGC6106)

Week 4
Project Integration Management
(Information Technology Project Management)
Chapter 4

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Learning Objectives

Describe an overall framework for project integration management

Explain the strategic planning process and apply different project selection methods

Explain the importance of creating a project charter to formally initiate projects

Describe project management plan development

Explain project execution and its relationship to project planning

Describe the process of monitoring and controlling project work

Understand the integrated change control process

Explain the importance of developing and following good procedures for closing projects

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The Key to Overall Project Success:
Good Project Integration Management

Project managers must coordinate all of the other knowledge areas throughout a project's life cycle

Many new project managers have trouble looking at the "big picture" and want to focus on too many details

Project integration management is *not* the same thing as software integration

Project Integration Management Processes

Develop the project charter: working with stakeholders to create the document that formally authorizes a project—the charter

Develop the project management plan: coordinating all planning efforts to create a consistent, coherent document—the project management plan

Direct and manage project execution: carrying out the project management plan by performing the activities included in it

Project Integration Management Processes
(Continue …)

Monitor and control the project work: overseeing project work to meet the performance objectives of the project

Perform integrated change control: coordinating changes that affect the project's deliverables and organizational process assets
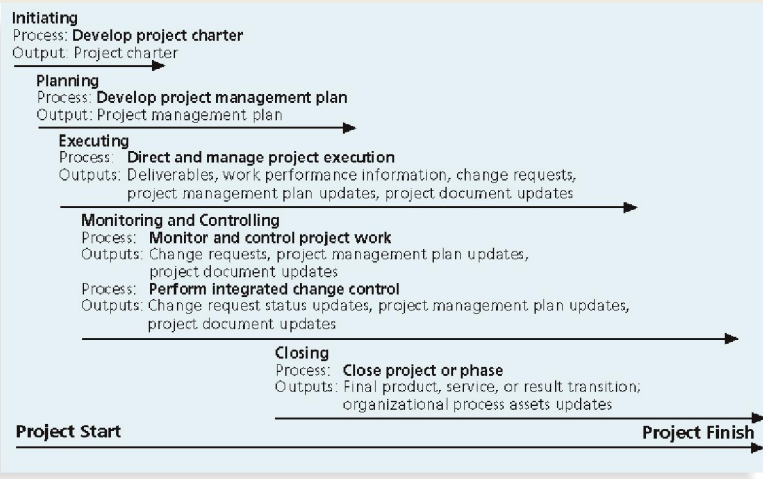
Close the project or phase: finalizing all project activities to formally close the project or phase

Project Integration Management Summary

Initiating
Process: **Develop project charter**
Output: Project charter

Planning
Process: **Develop project management plan**
Output: Project management plan

Executing
Process: **Direct and manage project execution**
Outputs: Deliverables, work performance information, change requests, project management plan updates, project document updates

Monitoring and Controlling
Process: **Monitor and control project work**
Outputs: Change requests, project management plan updates, project document updates
Process: **Perform integrated change control**
Outputs: Change request status updates, project management plan updates, project document updates

Closing
Process: **Close project or phase**
Outputs: Final product, service, or result transition; organizational process assets updates

Project Start   **Project Finish**

Strategic Planning and Project Selection

Strategic planning involves determining long-term objectives, predicting future trends, and projecting the need for new products and services

Organizations often perform a **SWOT** analysis
Analyzing **S**trengths, **W**eaknesses, **O**pportunities, and **T**hreats

As part of strategic planning, organizations:
• Identify potential projects
• Use realistic methods to select which projects to work on
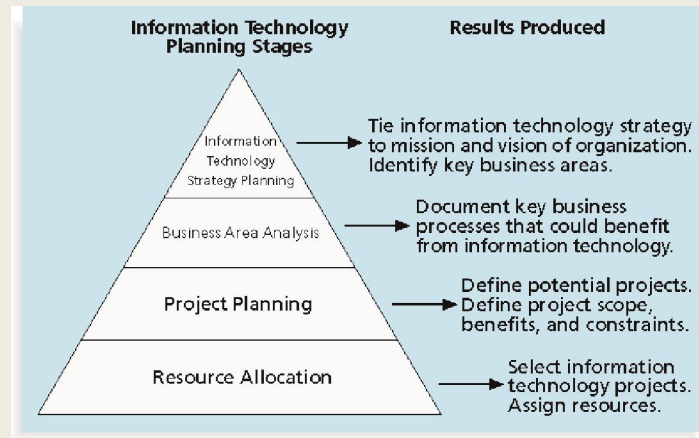• Formalize project initiation by issuing a project charter

Mind Map of a SWOT Analysis to Help Identify Potential Projects
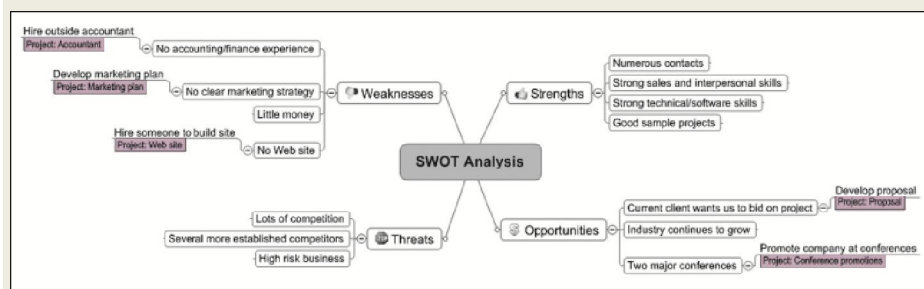
Information Technology Planning Process

Best Practice

‣ Only one in seven product concepts comes to fruition; why is it that some companies like Proctor & Gamble, Johnson and Johnson, Hewlett Packard, and Sony are consistently successful in NPD (New Product Development)?
  ‣ **Because they use a disciplined, systematic approach to NPD projects based on best practices**

‣ Four important forces behind NPD success include the following:

1. A product innovation and technology strategy for the business
2. Resource commitment and focusing on the right projects, or solid portfolio management
3. An effective, flexible, and streamlined idea-to-launch process
4. The right climate and culture for innovation, true cross-functional teams, and senior management commitment to NPD

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Methods for Selecting Projects

There are usually more projects than available time and resources to implement them

Methods for selecting projects include:

- Focusing on broad organizational needs
- Categorizing information technology projects
- Performing net present value or other financial analyses
- Using a weighted scoring model
- Implementing a balanced scorecard

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Focusing on Broad Organizational Needs

It is often difficult to provide strong justification for many IT projects, but everyone agrees they have a high value

"It is better to measure gold roughly than to count pennies precisely"

Three important criteria for projects:

There is a *need* for the project
There are *funds* available
There's a strong *will* to make the project succeed

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Categorizing IT Projects

One categorization is whether the project addresses:
- A problem
- An opportunity, *or*
- A directive

Another categorization is how long it will take to do and when it is needed

Another is the overall priority of the project

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Financial Analysis of Projects

Financial considerations are often an important consideration in selecting projects

Three primary methods for determining the projected financial value of projects:

- Net present value (NPV) analysis
- Return on investment (ROI)
- Payback analysis

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Net Present Value Analysis

Net present value (NPV) analysis is a method of calculating the expected net monetary gain or loss from a project by discounting all expected future cash inflows and outflows to the present point in time

Projects with a positive NPV should be considered if financial value is a key criterion

The higher the NPV, the better

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Net Present Value Example

	A	B	C	D	E	F	G
1	Discount rate	10%					
2							
3	PROJECT 1	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTAL
4	Benefits	$0	$2,000	$3,000	$4,000	$5,000	$14,000
5	Costs	$5,000	$1,000	$1,000	$1,000	$1,000	$9,000
6	Cash flow	($5,000)	$1,000	$2,000	$3,000	$4,000	$5,000
7	NPV ⟶	$2,316					
8		Formula =npv(b1,b6:f6)					
9							
10	PROJECT 2	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTAL
11	Benefits	$1,000	$2,000	$4,000	$4,000	$4,000	$15,000
12	Costs	$2,000	$2,000	$2,000	$2,000	$2,000	$10,000
13	Cash flow	($1,000)	$0	$2,000	$2,000	$2,000	$5,000
14	NPV ⟶	$3,201					
15		Formula =npv(b1,b13:f13)					
16							
17							

Note that totals are equal, but NPVs are not because of the time value of money

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NPV Calculations

1. Determine estimated costs and benefits for the life of the project and the products it produces

2. Determine the discount rate (check with your organization on what to use)

3. Calculate the NPV (see text for details)

$$NPV = \sum_{t=0}^{n} \frac{(Benefits - Costs)_t}{(1 + r)^t}$$

where:
r = discount rate
t = year
n = analytic horizon (in years)

Return on Investment

▶ **Return on investment** (ROI) is calculated by subtracting the project costs from the benefits and then dividing by the costs
  ROI = (total discounted benefits - total discounted costs) / discounted costs
▶ The higher the ROI, the better
▶ Many organizations have a **required rate of return** or minimum acceptable rate of return on investment for projects
▶ **Internal rate of return** (IRR) can by calculated by finding the discount rate that makes the NPV equal to zero

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Payback Analysis

•Another important financial consideration is payback analysis

•The **payback period** is the amount of time it will take to recoup, in the form of net cash inflows, the total dollars invested in a project

•Payback occurs when the net cumulative discounted benefits equals the costs

•Many organizations want IT projects to have a fairly short payback period

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Payback Analysis (Continue …)

Charting the payback period
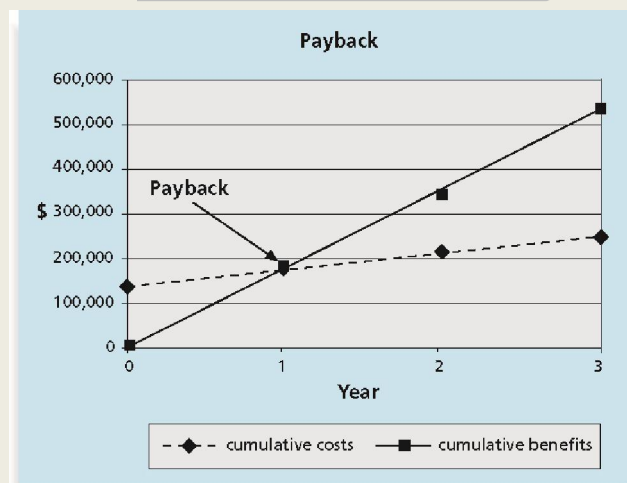
Weighted Scoring Model

A weighted scoring model is a tool that provides a systematic process for selecting projects based on many criteria

Steps to create a weighted scoring model :

- Identify criteria important to the project selection process
- Assign weights (percentages) to each criterion so they add up to 100%
- Assign scores to each criterion for each project
- Multiply the scores by the weights and get the total weighted scores

The higher the weighted score, the better

Weighted Scoring Model (Continue ...)

Some possible criteria for IT projects are :

- Supporting key business objectives
- Has strong internal sponsor
- Has strong customer support
- Uses realistic level of technology
- Can be implemented in one year or less
- Provides positive NPV
- Has low risk in meeting scope, time, and cost goals

Weighted Scoring Model (Continue …)

Sample Weighted Scoring Model for Project Selection

	A	B	C	D	E	F
1	Criteria	Weight	Project 1	Project 2	Project 3	Project 4
2	Supports key business objectives	25%	90	90	50	20
3	Has strong internal sponsor	15%	70	90	50	20
4	Has strong customer support	15%	50	90	50	20
5	Uses realistic level of technology	10%	25	90	50	70
6	Can be implemented in one year or less	5%	20	20	50	90
7	Provides positive NPV	20%	50	70	50	50
8	Has low risk in meeting scope, time, and cost goals	10%	20	50	50	90
9	Weighted Project Scores	100%	56	78.5	50	41.5

Weighted Score by Project

Project Charters

• After deciding what project to work on, it is important to let the rest of the organization know

• A **project charter** is a document that formally recognizes the existence of a project and provides direction on the project's objectives and management

• Key project stakeholders should sign a project charter to acknowledge agreement on the need and intent of the project; a signed charter is a key output of project integration management

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Project Charter for the DNA-Sequencing Instrument Completion Project

Project Title: DNA-Sequencing Instrument Completion Project
Date of Authorization: February 1
Project Start Date: February 1   **Projected Finish Date:** November 1

Key Schedule Milestones:

- Complete first version of the software by June 1
- Complete production version of the software by November 1

Budget Information: The firm has allocated $1.5 million for this project, and more funds are available if needed. The majority of costs for this project will be internal labor. All hardware will be outsourced.

Project Manager: Nick Carson, (650) 949-0707, ncarson@dnaconsulting.com

Project Objectives: The DNA-sequencing instrument project has been underway for three years. It is a crucial project for our company. This is the first charter for the project, and the objective is to complete the first version of the software for the instrument in four months and a production version in nine months.

Main Project Success Criteria: The software must meet all written specifications, be thoroughly tested, and be completed on time. The CEO will formally approve the project with advice from other key stakeholders.

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Charter
(Continue …)

Approach:

- Hire a technical replacement for Nick Carson and a part-time assistant as soon as possible.
- Within one month, develop a clear work breakdown structure, scope statement, and Gantt chart detailing the work required to complete the DNA sequencing instrument.
- Purchase all required hardware upgrades within two months.
- Hold weekly progress review meetings with the core project team and the sponsor.
- Conduct thorough software testing per the approved test plans.

ROLES AND RESPONSIBILITIES

Name	Role	Position	Contact Information
Ahmed Abrams	Sponsor	CEO	aabrams@dnaconsulting.com
Nick Carson	Project Manager	Manager	ncarson@dnaconsulting.com
Susan Johnson	Team Member	DNA expert	sjohnson@dnaconsulting.com
Renyong Chi	Team Member	Testing expert	rchi@dnaconsulting.com
Erik Haus	Team Member	Programmer	ehaus@dnaconsulting.com
Bill Strom	Team Member	Programmer	bstrom@dnaconsulting.com
Maggie Elliot	Team Member	Programmer	melliot@dnaconsulting.com

Sign-off: (Signatures of all the above stakeholders)

Ahmed Abrams	Nick Carson
Susan Johnson	Renyong Chi
Erik Haus	Bill Strom
Maggie Elliot	

Comments: (Handwritten or typed comments from above stakeholders, if applicable)

"I want to be heavily involved in this project. It is crucial to our company's success, and I expect everyone to help make it succeed." —Ahmed Abrams

"The software test plans are complete and well documented. If anyone has questions, do not hesitate to contact me." —Renyong Chi

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Project Management Plans

• A **project management plan** is a document used to coordinate all project planning documents and help guide a project's execution and control

• Plans created in the other knowledge areas are subsidiary parts of the overall project management plan

Common Elements of a Project Management Plan

• Introduction or overview of the project

• Description of how the project is organized

• Management and technical processes used on the project

• Work to be done, schedule, and budget information

Sample Contents for a Software Project Management Plan (SPMP)

MAJOR SECTION HEADINGS	SECTION TOPICS
Overview	Purpose, scope, and objectives; assumptions and constraints; project deliverables; schedule and budget summary; evolution of the plan
Project Organization	External interfaces; internal structure; roles and responsibilities
Managerial Process Plan	Start-up plans (estimation, staffing, resource acquisition, and project staff training plans); work plan (work activities, schedule, resource, and budget allocation); control plan; risk management plan; closeout plan
Technical Process Plans	Process model; methods, tools, and techniques; infrastructure plan; product acceptance plan
Supporting Process Plans	Configuration management plan; verification and validation plan; documentation plan; quality assurance plan; reviews and audits; problem resolution plan; subcontractor management plan; process improvement plan

IEEE Standard 1058-1998.

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Project Execution

Project execution involves managing and performing the work described in the project management plan

The majority of time and money is usually spent on execution

The application area of the project directly affects project execution because the products of the project are produced during execution

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Coordinating Planning and Execution

Project planning and execution are intertwined and inseparable activities

Those who will do the work should help to plan the work

Project managers must solicit input from the team to develop realistic plans

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Important Skills for Project Execution

General management skills like leadership, communication, and political skills

Product, business, and application area skills and knowledge

Use of specialized tools and techniques

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Project Execution Tools and Techniques

Expert judgment: experts can help project managers and their teams make many decisions related to project execution

Project management information systems: there are hundreds of project management software products available on the market today, and many organizations are moving toward powerful enterprise project management systems that are accessible via the Internet

See the What Went Right? example of Kuala Lumpur's Integrated Transport Information System on p. 159

Monitoring and Controlling Project Work

Changes are inevitable on most projects, so it's important to develop and follow a process to monitor and control changes

Monitoring project work includes collecting, measuring, and disseminating performance information

A **baseline** is the approved project management plan plus approved changes

Integrated Change Control

Three main objectives are:

Influencing the factors that create changes to ensure that changes are beneficial

Determining that a change has occurred

Managing actual changes as they occur

Change Control on Information Technology Projects

Former view: the project team should strive to do exactly what was planned on time and within budget

Problem: stakeholders rarely agreed up-front on the project scope, and time and cost estimates were inaccurate

Modern view: project management is a process of constant communication and negotiation

Solution: changes are often beneficial, and the project team should plan for them

Configuration Management

Ensures that the descriptions of the project's products are correct and complete

Involves identifying and controlling the functional and physical design characteristics of products and their support documentation

Configuration management specialists identify and document configuration requirements, control changes, record and report changes, and audit the products to verify conformance to requirements

See www.icmhq.com for more information

Suggestions for Performing Integrated Change Control

View project management as a process of constant communication and negotiation.

Plan for change.

Establish a formal change control system, including a change control board (CCB).

Use effective configuration management.

Define procedures for making timely decisions on smaller changes.

Use written and oral performance reports to help identify and manage change.

Use project management and other software to help manage and communicate changes.

Focus on leading the project team and meeting overall project goals and expectations.

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Closing Projects and Phases

To close a project or phase, you must finalize all activities and transfer the completed or cancelled work to the appropriate people

Main outputs include:

Final product, service, or result transition

Organizational process asset updates

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Using Software to Assist in Project Integration Management

Several types of software can be used to assist in project integration management:

Documents can be created with word processing software

Presentations are created with presentation software

Tracking can be done with spreadsheets or databases Communication software like e-mail and Web authoring tools facilitate communications

Project management software can pull everything together and show detailed and summarized information

Business Service Management (BSM) tools track the execution of business process flows

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Any questions?

HW3: **Project Charter for your IT project**

Generate the Project Charter to an information technology project with which you are familiar.

Format your Project Charter like the sample in Slides 25 and 26.