INFO 6245 Planning & Managing Information Systems Development

Module 3

Project Integration Management

Project Integration

Coordination of all project management knowledge areas throughout a project's lifecycle.

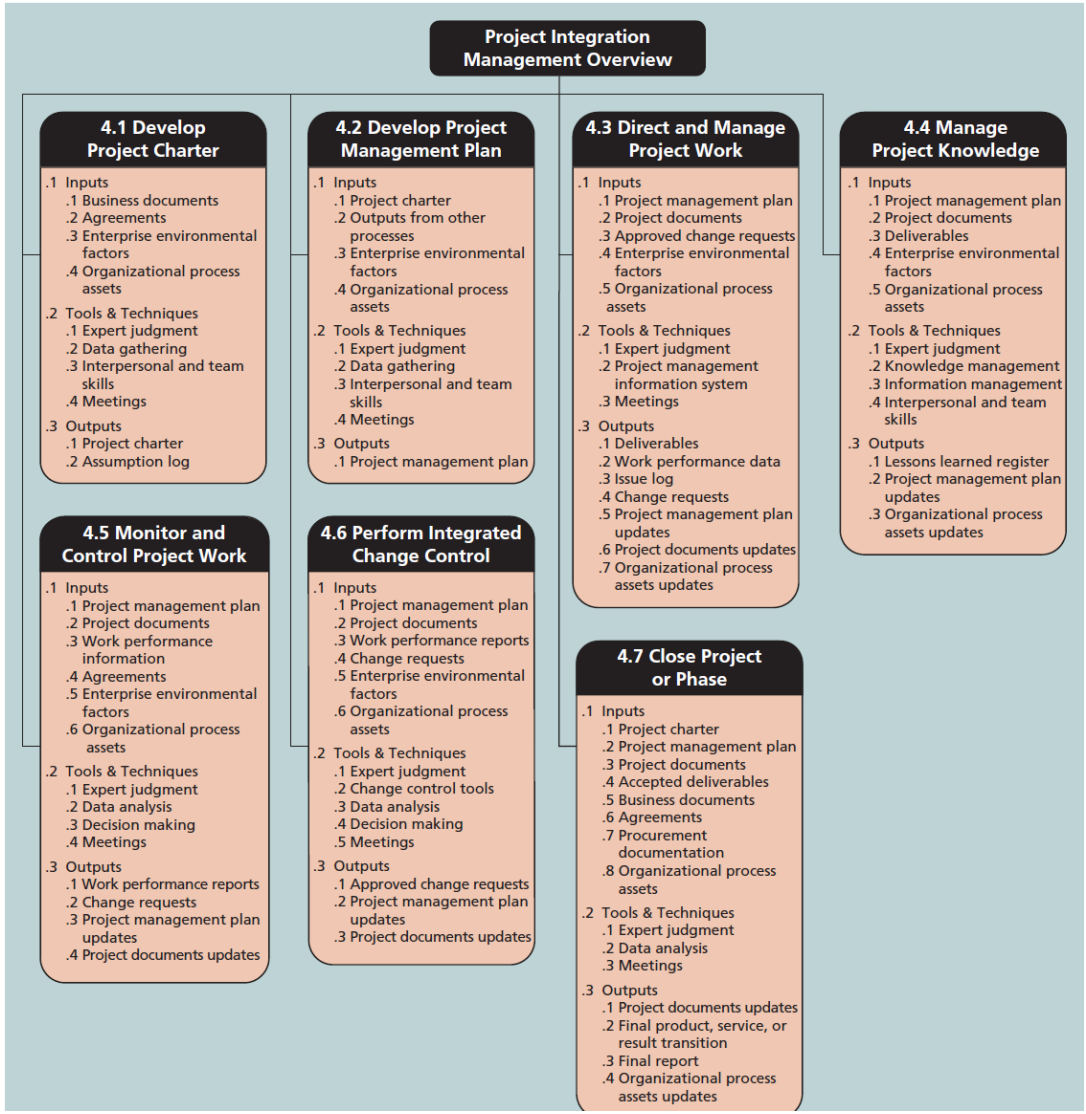
Ensures that all elements of a project come together at the right time to complete a project successfully

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

PMI Summary

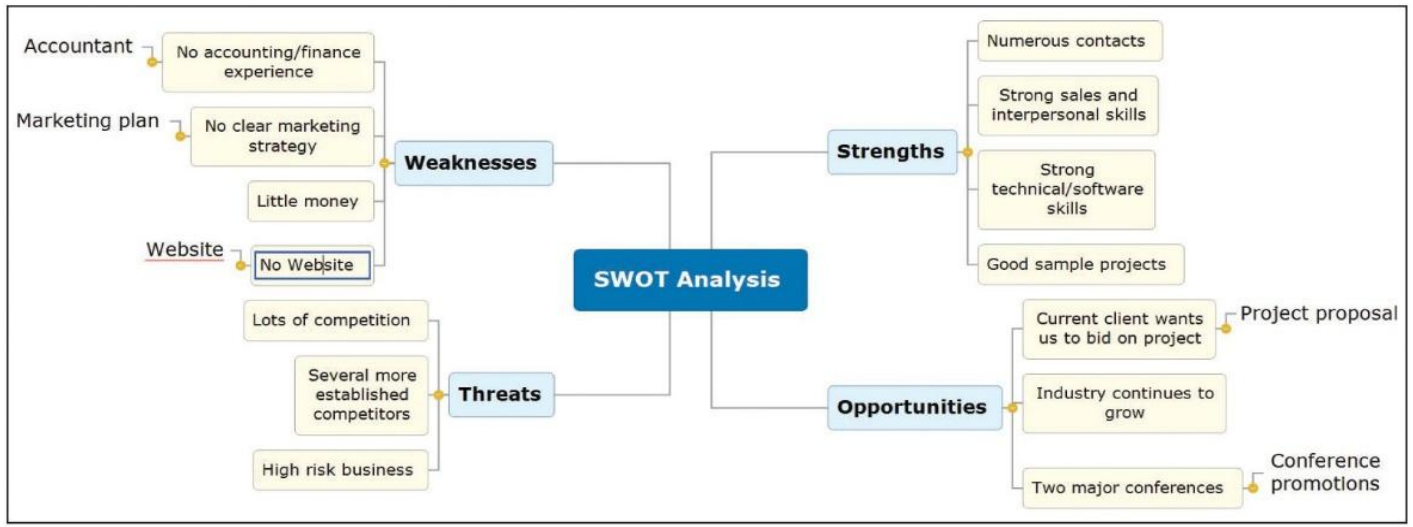
1. **Developing the project charter** involves working with stakeholders to create the document that formally authorizes a project—the charter.
2. **Developing the project management plan** involves coordinating all planning efforts to create a consistent, coherent document—the project management plan.
3. **Directing and managing project work** involves carrying out the project management plan by performing the activities included in it.
4. **Managing project knowledge** involves using existing knowledge and creating new knowledge to achieve project objectives while also contributing to organizational learning.
5. **Monitoring and controlling project work** involves overseeing activities to meet the performance objectives of the project.
6. **Performing integrated change control** involves identifying, evaluating, and managing changes throughout the project life cycle.
7. **Closing the project or phase** involves finalizing all activities to formally close the project or phase.



Strategic Planning

Involves determining long-term objectives	Analyzing the strengths and weaknesses of an organization. Studying opportunities and threats in the business environment. Predicting future trends; Projecting the need for new products/services.
SWOT analysis	Strengths, Weaknesses, Opportunities, and Threats
Identifying potential projects	Start of project initiation
Aligning IT with business strategy	Organization must develop a strategy for using IT to define how it will support the organization’s objectives

SWOT Analysis



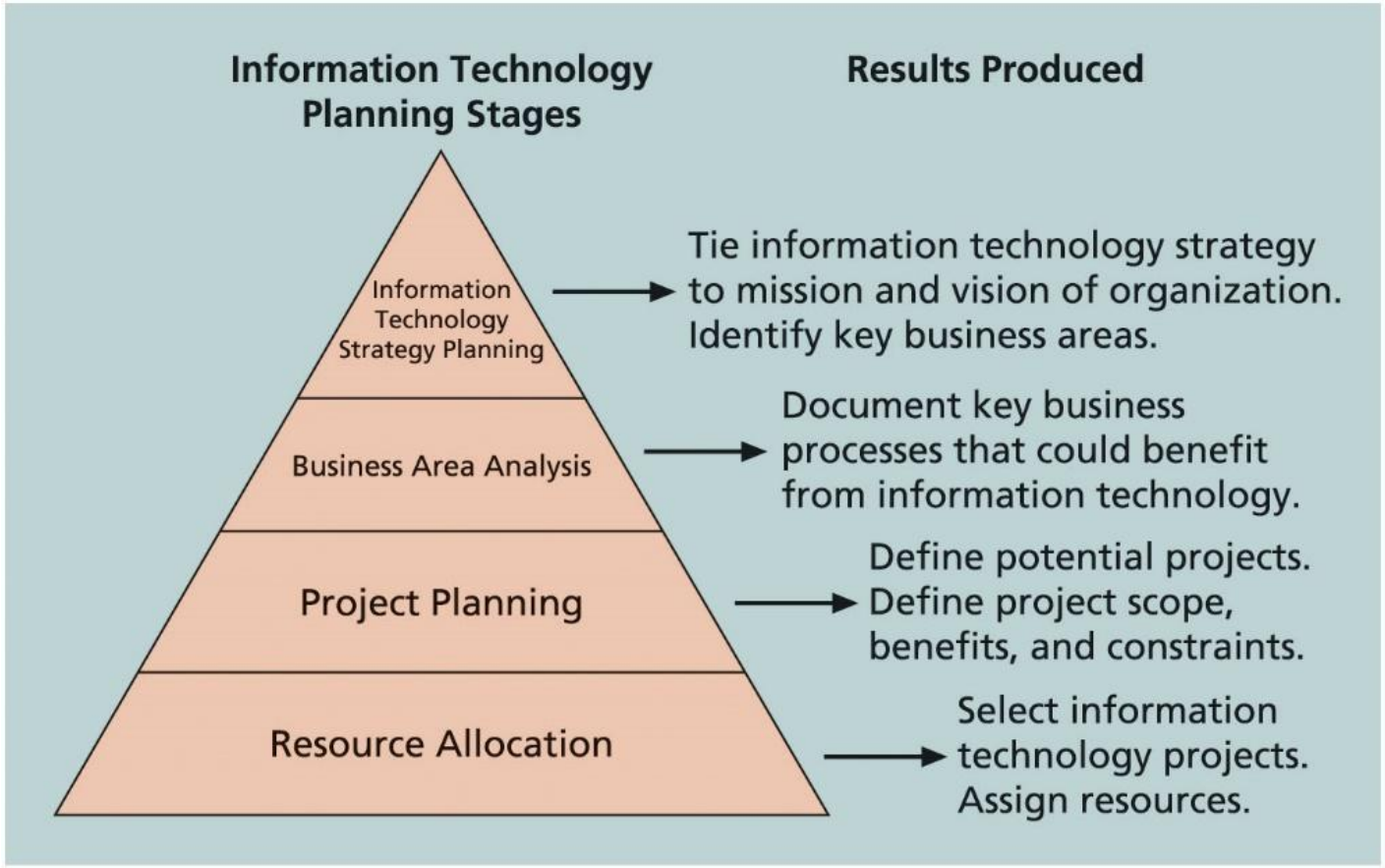
SCENARIO:

Group of people who want to start a new business in the film industry could perform a SWOT analysis to help identify potential projects.

Based on their SWOT analysis, the four entrepreneurs outline potential projects as follows:

- Find an external accountant or firm to help run the business.
- Hire someone to develop a company website, focusing on our experience and past projects.
- Develop a marketing plan.
- Develop a strong proposal to get the large project the potential client mentioned.
- Plan to promote the company at two major conferences this year.

Selecting IT Projects



- First, a steering committee develops an IT strategic plan that is tied to the organization's overall strategy.
- Next, a business area analysis is performed to outline business processes that are central to achieving strategic goals and help determine which processes could most benefit from IT.
- Then, the organization starts defining the scope, benefits, and constraints of potential IT projects.
- Last, the organization chooses the projects to execute that serve the IT strategic plan and assigns resources for working on them.

Methods for Project Selection

Focusing on broad organizational needs

- More likely to be successful
- Important criteria like need, funding, or will

Categorizing information technology projects

- Respond to a problem, opportunity, or directive

Performing Net Present Value (NPV) or other financial analyses

- Considering financial gain, understand current economics

Using a weighted scoring model

- Identify important criteria, assign weights and scores, and quantitatively prioritize projects

Implementing a balanced scorecard

- A strategic system that aligns business activities to strategy, improves communications, & monitors performance

Net Present Value (NPV)

- 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
- NPV accounts for the **time value of money**, considering that money received earlier is more valuable than the same amount received later.
- Projects with a **positive NPV** should be considered if financial value is a key criterion
- **Higher the NPV, the better**

	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

NPV Calculations

- Input: Determine estimated costs and benefits for the life of the project and the products it produces
  - Can use Cash Flow estimates per year, which will determine Present Value (PV) for any given year
- Input: Determine the discount rate
  - Discount rate can vary, often based on the prime rate and other economic considerations
- Analysis: Calculate the net present value by adding the PV for all years that project will be active.

$$NPV = \sum_{t=0}^{n} \frac{R_t}{(1+i)^t}$$

t = time of the cash flow

i = discount rate

R_t = net cash flow

	A	B	C	D	E
1	**Discount rate**	10%			
2					
3	**Year**	**Cash Flow**	**PV**		
4	1	-$1,000	-$909.09	=B4/(1+$B$1)^A4	
5	2	$100	$82.64	=B5/(1+$B$1)^A5	
6	3	$200	$150.26	=B6/(1+$B$1)^A6	
7	4	$300	$204.90	=B7/(1+$B$1)^A7	
8	5	$400	$248.37	=B8/(1+$B$1)^A8	
9	6	$500	$282.24	=B9/(1+$B$1)^A9	
10					
11	**NPV (manual)**	**$59.33**	=SUM(C4:C9)		
12					
13	**NPV (Excel)**	**$59.33**	=NPV(B1,B4:B9)		

Internal Rate of Return (IRR)

- IRR represents the **annual rate of growth** that an investment is expected to generate.
- It is the rate at which cash inflows equal cash outflows without consideration of external factors.
- It is calculated using the same concept as Net Present Value (NPV) but sets the NPV equal to zero in a discounted cash flow analysis. Here **IRR is the discount rate that makes NPV equal to zero.**
- Many organizations have a required rate of return which can be a Minimum acceptable rate of return on investment for projects
- NPV is the total present value of cash flow for a project, and IRR is the discount rate that makes the NPV of future cash flows equal to zero and can be calculated as such.
- **Higher the IRR, the better**
- **Consider NPV before IRR**

$$0 = \text{NPV} = \sum_{t=1}^{T} \frac{C_t}{(1+IRR)^t} - C_0$$

where:

C_t = Net cash inflow during the period t

C_0 = Total initial investment costs

IRR = The internal rate of return

t = The number of time periods

Business Scenario

- Company X has a year-long project that is going to cost $1,000 and has a discount rate of 8%. At the end of the year, the company will receive $1,300. Calculating the NPV for this project looks like this:

NPV = -1,000 + 1,3001.08 = 203.70

- In general, if the NPV is greater than 0, a project is worth pursuing.
- The IRR calculation for this same project puts the NPV at 0. When the NPV is 0, it acts as the break-even point. If that's the case, it will look like this:

0 = -1,000 + 1,300 (1+IRR)

- Notice how the discount rate of 8% is replaced with IRR, but the formula remains the same.
- Solving for IRR, you will get 0.30 or 30%.

What does this mean for the project?

Company X can't forget about their discount rate of 8%, used to calculate the NPV. IRR is compared to the opportunity cost to decide on accepting or declining a project.

As a general rule, if the IRR is higher than the opportunity cost, a company can accept the project or investment. If the project's "breakeven" return is greater than the company's opportunity cost, the company could take on this project and increase its value.

Return On Investment (ROI)

Calculation of the rate of return for a given investment for a given period of time.

When determining the ROI for a project, the goal is to have a reliable value that indicates if there will be a positive return on the project's investment.

And from that ROI calculation, your organization can decide on if resources should be put forward for the project.

Projects typically carry extra risks, and the ROI is a way to compare the project investment to other well-understood risks available.

Positive ROI means there is profit or gain from the project. The higher the ROI, the better

ROI Calculations

(Not in Syllabus)

- Calculated by subtracting the project costs from the benefits and then dividing by the costs
  - ROI = (total discounted benefits - total discounted costs) / discounted costs
- ROI formula can be presented multiple ways. A business may be using ROI for an investment instead of a project, so the term will be "Cost of Investment" vs the "Project Cost." ROI is determined using the same mathematical process in both cases, which is **Return / Investment**.
- The project manager needs to know how to interpret the result.
  - If ROI<1 or negative, there is no profit or financial gain in the project.
  - If ROI = 0, there is no loss nor gain
  - **If ROI>1 or positive, then there is a profit or gain from the project**.

Financial ROI Formula

$$\text{Return on Investment} = \frac{\text{Net Profit}}{\text{Cost of Investment}} \times 100$$

Project ROI Formula

$$\text{Return on Investment} = \frac{\text{Financial Value} - \text{Project Cost}}{\text{Project Cost}} \times 100$$

You can purchase 1,000 bars of chocolate for $2 apiece. You plan to sell the chocolate to a grocery store for $3 per piece. In addition to the cost of purchasing the chocolate, you need to pay $100 in transportation costs.

Should you pursue this opportunity? Will you make a profit?

- *First tally your total expenses and your total expected revenues.*
  - *Expected Revenues = 1,000 x $3 = $3,000*
  - *Total Expenses = (1,000 x $2) + $100 = $2,100*
- *Subtract the expenses from your expected revenue to determine the net profit.*
  - *Net Profit = $3,000 - $2,100 = $900*
- *To calculate the expected return on investment, divide the net profit by the cost of the investment, and multiply that number by 100.*
  - *ROI = ($900 / $2,100) x 100 = 42.9%*

By running this calculation, you see the project will yield a positive return on investment, so long as factors remain as predicted. Therefore, it's a sound financial decision. If the endeavor yielded a negative ROI, or an ROI that was so low it didn't justify the amount of work involved, you would know to avoid it moving forward.

Question 1:

You are doing some analysis to help with project selection. There is ongoing debate concerning which projects to select. You have the following to choose from: Project A with an IRR of 11.5%, Project B with an IRR of 18%, Project C with an IRR of 15%, and Project D with an IRR of 13%. You can select only one project. Which should you choose?

- Project A
- Project B
- Project C
- Project D

Answer: Project B

You always choose the project with the highest internal rate of return (IRR). In this case, you should choose Project B with an IRR of 18%.

Question 2:

Your project selection committee is considering four projects. Project A's NPV is positive, it has an IRR of 14 percent, and the payback period is 21 months. Project B's NPV is negative, it has an IRR of 9 percent, and the payback period is 16 months. Project C's NPV is positive, it has an IRR of 16 percent, and the payback period is 18 months. Project D's NPV is negative, it has an IRR of 16 percent, and the payback period is 13 months. Which project should you choose?

- Project A
- Project B
- Project C
- Project D

Answer: Project C

Since Project B and Project D both have negative NPV, they shouldn't be chosen. Project C has a higher IRR value than Project A and should be the project you choose. Payback period is the least precise of all cash flow calculations, so you shouldn't give this a lot of consideration if NPV is positive and IRR is greater than 0.

Project Charter

Developing a Project Charter

- A project charter is a document that formally recognizes the existence of a project
- It provides direction on the project's objectives and management
- It is a key output of the initiation process
- Key project stakeholders should sign a project charter to acknowledge agreement on the need and intent of the project

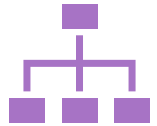
Project Charter Inputs

Business case

Benefits management plan

Agreements

Enterprise environmental factors



Organizational process assets

Example Project Charter

Project Title: Next-gen 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 Next-gen DNA-sequencing instrument project has been under way for three years. It is a crucial project for our company. This is the first charter for the project; the objective is to complete the first version of the instrument software in four months and a production version in nine months.

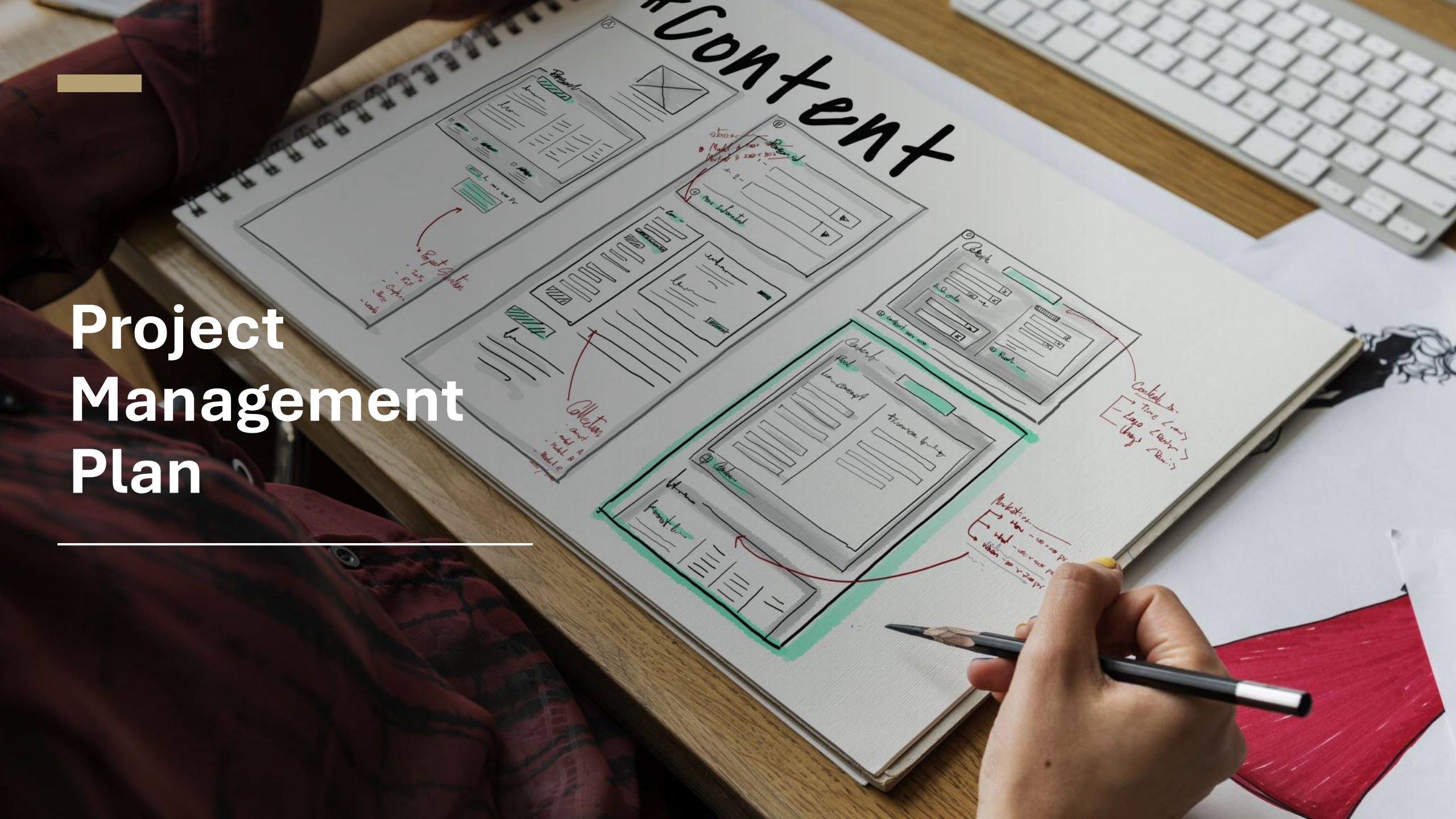
Main Project Success Criteria: The software must meet all written specifications, be thoroughly tested, and be completed on time. The CEO will formally approve the project with advice from other key stakeholders.

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 Next-gen 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



Project Management Plan

Developing a Project Mgt Plan

A document used to coordinate the entire project planning and help guide a project's execution and control

All team members should be involved in preparing project management plans and should adhere to their guidelines

Captures project planning assumptions and decisions, facilitates communication among stakeholders, defines the content, extent, and timing of key management reviews, and provide a baseline for progress measurement and project control.

Should be dynamic, flexible, and subject to change when the environment or project changes.

Developing a Project Mgt Plan

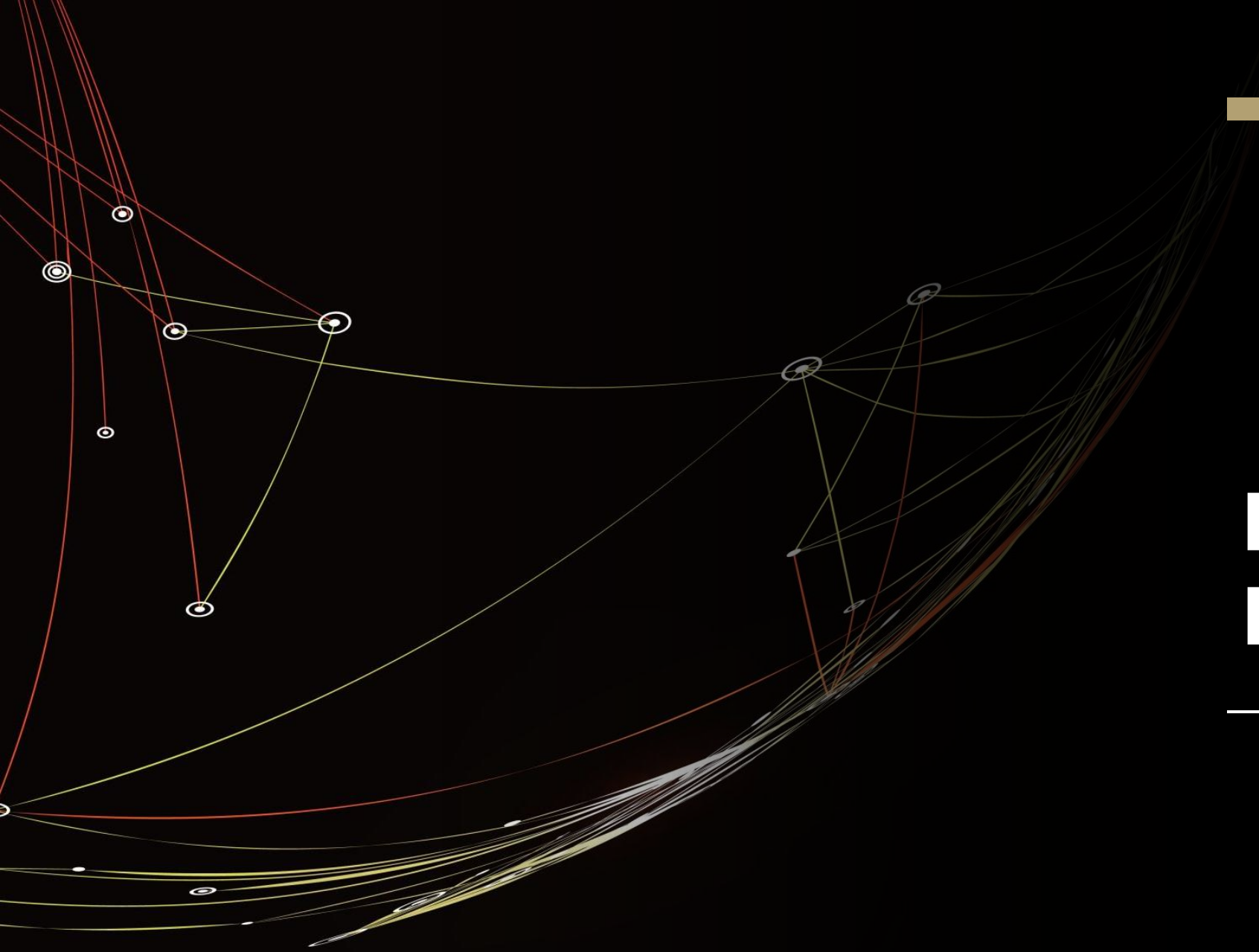
Guidelines for Project Mgt Plan

- More than just a Gantt Chart
- Most organizations have a standardized template for efficiency
- DOD Standard 2167, Software Development Plan
  - Describes the format for contractors to use when creating a software development plan for Department of Defense projects
- IEEE Standard 1058–1998
  - describes the contents of its Software Project Management Plan (SPMP)

Project Mgt Plan: Contents

- Introduction/overview of the project
- Project organization
- Management and technical processes
- Project lifecycle description
- Development approach
- Work to be performed (scope)
- Schedule and budget information
- References to other project planning documents

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



Project Work Management

Directing & Managing Project Work

The project manager needs to focus on leading the project team and managing stakeholder relationships to execute the project management plan successfully

Project resource management, communications management, and stakeholder management are crucial to a project's success

Involves managing and performing the work described in the project management plan

Most of the time and money is usually spent on execution

The application area of the project directly affects project execution

Products of the project are produced during the execution phase

Planning & Execution

Project planning and execution are intertwined and inseparable activities

The main function of creating a project management plan is to guide project execution

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

All project personnel need to develop both planning and executing skills, and they need experience in these areas

Leadership & Support

Lead

Project managers must lead by example

- Demonstrate the importance of creating and then following good project plans and following them in project execution

Help

Organizational culture can help project execution

- Providing guidelines and templates
- Tracking performance based on plans

Break

Project managers may still need to break the rules to meet project goals

- Senior managers must support those actions

Subject-Matter Expertise

It is often helpful for IT project managers to have prior technical experience

Small projects: The project manager may be required to perform some of the technical work or mentor team members to complete the projects

Large projects: The project manager must understand the business and application area of the project

Managing Project Knowledge

Explicit knowledge:

Easily explained using words, pictures, or numbers

Easy to communicate, store, and distribute

Tacit knowledge:

Difficult to express and highly personal

Shared through conversations & interactions

A lessons-learned register is one of the main outputs of managing project knowledge;
Documents challenges, problems, realized risks and opportunities

Monitoring & Controlling

Changes are inevitable on most projects; It is important to develop and follow a process to monitor and control changes

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

The project management plan provides the baseline for identifying and controlling project changes

A baseline is a starting point, a measurement, or an observation that is documented so that it can be used for future comparison.

Change Control

- Main objectives
  - Influencing the factors that create changes to ensure that changes are beneficial
  - Determining that a change has occurred
  - Managing actual changes as they occur
- Waterfall view:
  - The project team should strive to do exactly what was planned on time and within budget
  - Problem: project teams could rarely meet original project goals
- Agile view:
  - Project management is a process of constant communication and negotiation
  - Solution: changes are often beneficial, and the project team should plan for them

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) and IT steering committee.
Use effective configuration management.
Define procedures for making timely decisions about smaller changes.
Use written and oral performance reports to help identify and manage change.
Use project management software and other software to help manage and communicate changes.
Focus on leading the project team and meeting overall project goals and expectations.

Change Control System

Formal, documented process that describes when and how official project documents and work may be changed

Describes who is authorized to make changes, paperwork required for these changes, and any automated or manual tracking systems the project will use

Change control board (CCB) is a formal group of people responsible for approving or rejecting changes on a project

Provide guidelines for preparing change requests, evaluate change requests, and manage the implementation of approved changes

CCB policies can define cadence for recurring meetings + ad-hoc meetings to address time-sensitive changes

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

Closing Projects or Phases

Project documents updated:

- All project documents should be reviewed and marked as final versions. Others may need to refer to these documents in the future, and it's important that they be accurate.

Final product, service, or result transition:

- Project sponsors are usually most interested in making sure they receive delivery of the final products, services, or results they expected when they authorized the project. For items produced under contract, formal acceptance or handover includes a written statement that the terms of the contract were met. Internal projects can also include some type of project completion form.

Final report:

- A final project report and presentation are commonly used during project closing to summarize how the final project, product, service, or result achieved the benefits and business needs that were identified in the initial project plan.

Organizational process asset updates:

- The project team should provide a list of project documentation, project closure documents, and historical information produced by the project in a useful format. This information is considered a process asset. For example, the lessons-learned register.

Agile/Adaptive Environments

Iterative and agile approaches promote the engagement of team members

Expectations of the project manager do not change in an adaptive environment, but control of the detailed product planning and delivery is delegated to the team

Project managers should focus on creating a collaborative decision-making environment and providing opportunities for team members to develop additional skills

In-Class Group Exercise

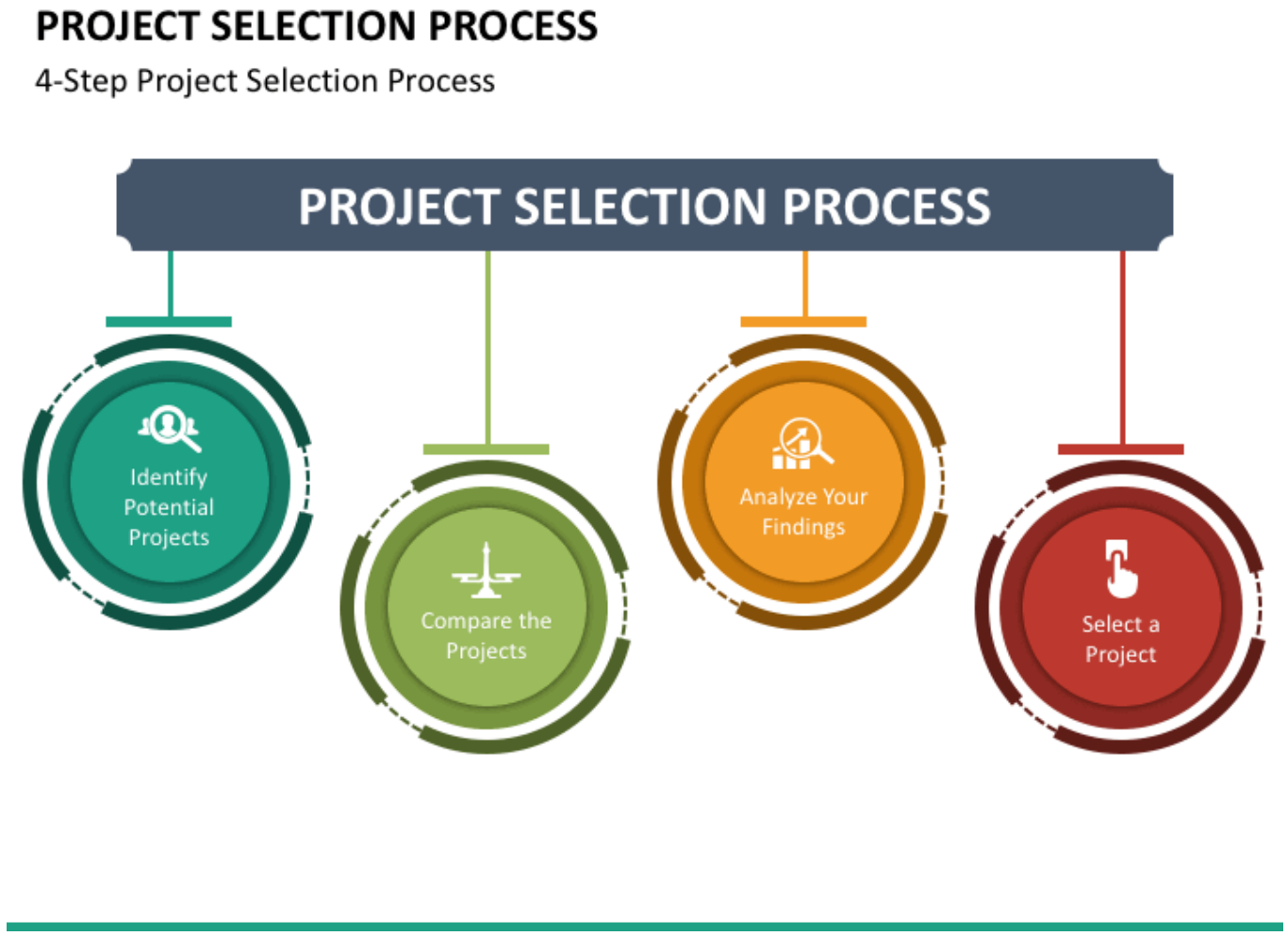
Project Topic

Activity

- Compare the projects you shortlisted last class
- Go through the project selection process
- Choose a project topic that can be used as part of class activities throughout the semester.

Guidelines

- Choose a topic within bounds of the IT/IS Field (related to your degree).
- Make sure that the project is simple and achievable.
- Team can choose a sub-project within a larger development effort, or a new project, or a startup idea. Anything goes!



Framing the Project

Who are the sponsors? What are their expectations?

What problem are you solving? What gap are your addressing? What need are you fulfilling?

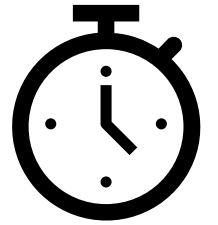
Who are the customers/consumers/end-users? What are their requirements?

Is it a product or a service? What exactly are you developing?

How long with the development take?

What is the end-goal of your project?

Project Charter & Plan



- Draft a project charter for your group project
- Template is provided in the Canvas Module 3
- 30 minutes to complete the exercise and submit to discussion group

Assignment

Assignment #1

Analyze the Healthcare.gov project with a focus on Project Integration Management by identifying what went wrong and how managing the project integration aspects could have mitigated these issues.

Conduct research to find information on this project – what went wrong, why it went wrong, what were the obstacles, etc. Research beyond just the article provided and find other sources of information.

Begin with a brief overview of the Healthcare.gov project, including its objectives, scope, and key stakeholders. Then, delve into the various aspects of Project Integration Management:

- Discuss how the project charter was developed and its effectiveness in aligning stakeholders and defining the project's vision; evaluate the planning processes, including the creation and maintenance of the project management plan.
- Analyze the execution phase, focusing on how project work was directed and managed.
- Examine the implementation of knowledge management practices and their impact on project outcomes.
- Assess the monitoring and controlling processes, including performance tracking and issue management.
- Discuss the change control processes and their effectiveness in managing project changes.
- Evaluate the project closure processes, including lessons learned and final deliverables.

In your critical analysis, identify key challenges and successes in the integration management of the Healthcare.gov project and discuss how better integration management could have improved the project outcomes. Conclude with a summary of your findings and provide recommendations for future projects based on the lessons learned from the Healthcare.gov project.

The paper should be 2-3 pages in length, formatted with Times New Roman 12-point font, 1-inch margins on all sides, and double-spaced text. The content should be left-aligned, with clear headings and subheadings to organize the material. The paper should follow the APA style guidelines as described here: Student Paper Setup Guide, APA Style 7th Edition.