Software Project Management
Subject code: 18BIT65S

UNIT II: Defining the Work Breakdown Structure: Defining a WBS Approach- The Mechanism of Creating a WBS – why you need a WBS – Creating a WBS dictionary. Creating the Budget: Budget Basics – Implementing Bottom–up cost Estimates-Budget at Completion –Zero –Based Budgeting–Determining Project Expenses. (Chap-4- page:157-165, Chap-5- page: 190-213).

TEXTBOOK

Joseph Philips, "IT Project Management", Third edition, TMH, New Delhi, 2012.

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- **What is a project?**

A project is a carefully defined set of activities that use resources (money, people, materials, energy, space, provisions, communication, motivation, etc.) to achieve the project goals and objectives.

- **What is a Project Management?**

Project management is the discipline of planning, organizing and managing resources to bring about the successful completion of specific project goals and objectives.

- **What is a Software Project Management?**

Software project management is a sub-discipline of project management in which software projects are planned, monitored and controlled.

Introduction

- Dividing complex projects to simpler and manageable tasks is the process identified as Work Breakdown Structure (WBS).

- Usually, the project managers use this method for simplifying the project execution. In WBS, much larger tasks are broken down to manageable chunks of work. These chunks can be easily supervised and estimated.

- WBS is not restricted to a specific field when it comes to application. This methodology can be used for any type of project management.

Following are a few reasons for creating a WBS in a project:

- Accurate and readable project organization.

- Accurate assignment of responsibilities to the project team.

- Indicates the project milestones and control points.

Work Breakdown Structure (WBS)

- A work breakdown structure in project management and systems engineering, is a tool used to define and group a project's discrete work elements (or tasks) in a way that helps organize and define the total work scope of the project.

- A work breakdown structure element may be a product, data, a service, or any combination.

- A WBS also provides the necessary framework for detailed cost estimating and control along with providing guidance for schedule development and control.

- The work breakdown structure is a graphical tool that displays the project's statement of work making it easier to understand and communicate. It is employed from the earliest stages of project planning.

- The work breakdown structure is a powerful tool for expressing the scope or extent of a project in simple graphic terms. It represents the project in terms of the hierarchy of deliverables and services it will produce. The project is therefore described just as a manufacturer would document the bill of materials breakdown for a washing machine or automobile.

- The WBS starts with a single box at the top which represents the whole project. The project is then partitioned into its components with lower level boxes.

The role of the WBS is to:

- Partition the major project deliverables into smaller components to improve the accuracy of cost estimates

- Provide a mechanism for collecting and organizing actual costs

- Provide a mechanism for performance measurement and control

WBS is necessary because it serves as input to five key project management activities:

- Cost estimating
- Cost budgeting
- Resource planning
- Risk management planning
- Activity definition

Working with a WBS

- Record the overarching objective you are trying to accomplish. This objective could be anything from developing a new software feature to building a missile.

- Divide the overarching project into smaller and smaller pieces, but stop before you get to the point of listing out every action that must be taken. Remember to focus on concrete deliverables rather than actions.

- Depending on the nature of your project, start dividing by project phases, specific large deliverables, or sub-tasks.

Coordinating WBS components

Rules to create a work breakdown structure

- Include 100% of the work necessary to complete the goal.

- Don't account for any amount of work twice.

- Focus on outcomes, not actions.

- A work package should take no less than 8 hours and no more than 80 hours of effort.

- Include about three levels of detail.

- Assign each work package to a specific team or individual.

Defining a WBS Approach

- There are essentially two ways to create a Work Breakdown Structure – the top-down or the bottom-up approach.

- The **top-down approach**, generates a complete and more accurate WBS. In this approach, the WBS is derived by decomposing the overall project into sub-projects or lower-level tasks. This decomposition is based on general project characteristics and not on detailed design elements. The decomposition continues until the tasks or work units reach a level where they can be accurately defined and estimated. This approach is by far more popular than the bottom-up approach.

- The **bottom-up approach** on the other hand is more akin to a brain-storming exercise where team members are asked to make a list of low-level tasks needed to complete the project. In many instances this can turn quite chaotic if the tasks identified by the team are not all at the same level. It can also be time consuming to ensure that all tasks at a given level have been completely identified.

- This approach is resource intensive since it assumes that all members of the team have sufficient domain knowledge and a complete understanding of the project requirements in order to be able to identify and integrate tasks at different levels.

Creating a WBS dictionary

What is a WBS dictionary?

- A WBS dictionary is formatted like the hierarchical structure, but it includes a brief description of each work package. When documenting a project, a WBS dictionary is often included in addition to a visualization of the WBS. It helps to clarify the scope of each task so that all team members understand their responsibilities.

Creating the Budget

- Creating a Budget
- Bottom-Up Cost Estimates
- Top-Down Cost Estimates
- Budget at Completion
- Zero-Based Budgeting

Budget needs

- To reach the project goal

- Predict the total cost

- Say why it will cost the amount

Why Estimating Time and Cost Are Important- Budget Basics

- Estimates are needed to support good decisions.

- Estimates are needed to schedule work.

- Estimates are needed to determine how long the project should take and its cost.

- Estimates are needed to determine whether the project is worth doing.

- Estimates are needed to develop cash flow needs.

- Estimates are needed to determine how well the project is progressing.

- Estimates are needed to develop time-phased budgets and establish the project baseline.

Top-down & Bottom-up

The top-down approach requires more logic & structure. It starts with the general and moves to the very specific.

It is a preferred method for creating a WBS.

It identify a solution first & then analyze or scrutinize the solution into steps required to implement it.

Bottom-up method would call for very specific solutions without examining into all of the details of each solution.

Implementing Bottom-Up Cost Estimates

The project manager is starting from the bottom of the project. Each component of the project has a monetary requirement assigned to it to ultimately predict the final cost. When u begin to create your budget, here are some issues to consider.

- Divide your project into phases

- Address the integration phase

- Consider the fully burdened workload required to complete each phase of the project

- Consider the costs for any specialized services

- Consider the costs for equipment

- Consider production costs

- Consider quality requirements

- Consider risk

Implementing Bottom-Up Cost Estimates

Now we are ready to calculate expenses.

For ex. In phase 1 of a project, Consider the expenses required to complete this stage of the project:

- Hardware to be purchased

- Software to be purchased

- Licensing issues

- Internal developers' time

- Percentage of time required by each team member to complete this phase of the project

- Risk and reserve funds

- Other expenses pertinent to your project

Implementing Top-Down Cost Estimates

Top-down budgets are often used by organizations that complete IT projects for other companies.

Within an organization, IT Pr.Ma have projects that are similar to other projects they've completed in the past.

This proven info. allows the Pr.Ma to save time of doing a bottom-up estimate.

Zero-Based Budgeting

It means that the budget for a dept. or program to be created must always start at zero.

ie. Zero balance at the beginning.

Ie. You can't take last year's budget , add 20 percent to it & claim that this new number is this year's upgrade budget.

Zero-Based Budgeting-Definition

- Zero-based budgeting is a technique of planning and decision-making which reverses the working process of traditional budgeting.

- In traditional incremental budgeting, departmental managers justify only increases over the previous year budget and what has been already spent is automatically sanctioned.

- A method of budgeting in which all expenses must be justified for each new period. A zero-based budgeting start from a "zero base" and every function within an organization is analyzed for its needs and costs. Budgets are then built around what is needed for the upcoming period, regardless of whether the budget is higher or lower than the previous one.

Advantages of Zero-Based Budgeting

- Efficient allocation of resources, as it is based on needs and benefits.

- Drives managers to find cost effective ways to improve operations.

- Detects inflated budgets.

- Municipal planning departments are exempt from this budgeting practice.

- Useful for service departments where the output is difficult to identify.

Disadvantages of Zero-Based Budgeting

- Difficult to define decision units and decision packages, as it is time-consuming and exhaustive.

- Forced to justify every detail related to expenditure. The R&D department is threatened whereas the production department benefits.

- Necessary to train managers. Zero-based budgeting must be clearly understood by managers at various levels to be successfully implemented. Difficult to administer and communicate the budgeting because more managers are involved in the process.