Pert and cpm technique pdf

Project management can be defined as a structural way to plan, plan, execute, monitor and control the various phases of the project. To achieve the ultimate goal of the project on time, PERT and CPM are two project management methods that each management must implement. These methods help in displaying progress and a series of actions and events of the project. The value of the PERT program (project) Evaluation and Review Technique (PERT) in activities to understand the planning, organization, planning, coordination and management of the project. This program helps you understand the research technique taken to complete a project, and determine the least and least time it takes to complete an entire project. PERT was developed in the 1950s with the aim of project time and time. The value of the CPM Critical Path or CPM method is a well-known method of modeling projects in project management. This is a resource-using algorithm that was developed in the 1950s by James Kelly and Morgan Walker. CPM is mainly used in projects to identify critical as well as non-critical tasks that will help prevent conflicts and reduce bottlenecks. Essentially, CPM is about choosing a path in a project that will help in calculating the least amount of time it takes to complete a task with the least number of losses. The Critical Path Method or CPM has been used in many industries, ranging from defense, construction, software, aerospace, etc. PERT vs. CPM Abbreviation PERT - Project Assessment and Review Of CPM Techniques - Critical Pathway Method What Does It Mean? PERT - PERT is a popular project management method that applies when the time required to complete a project is not a certain CPM - CPM is a statistical algorithm that has a certain start and end time for the PERT Type project - PERT is a probabilistic CPM model - CPM is the deterministic Focus PERT model - PERT's main focus is to minimize the time it takes to complete the CPM project - with a great emphasis on cutting costs. PERT-PERT orientation is an event-oriented CPM method - CPM is an activity-oriented method of PERT ExampleAdvantages of CPM provides sketches for long-term project coordination and planning. Recognizes Critical Actions Easy to Plan, Plan and Control a Project It Improves Performance Manages Resource, Necessary CPM Disadvantages For Beginners It's Hard to Understand Software Too Expensive Sometimes, to structure CPM too much time He can not control and form a schedule of the person involved in the resource allocation project can not be controlled properly Example How do you make an PERT chart? To prepare the PERT chart, you need to track down the next steps. Recognize specific projects and values. Decide To Decide project sequences. Create a network chart. Determine the time it takes for each project. Critical management. Update the PERT chart as the project progresses. CPM's Project Management Critical Path Method in Project Management is a step-by-step method used in the planning process that explains critical and non-critical project activities. CPM's goals are to check time-related issues and the process that causes the project to be blocked. CPM is preferable to projects that include different activities related to the complex method. Once CPM is applied, it will help you keep your projects back on track. Help recognize the action that needs to be done in time for the entire project to be completed on time. What responsibilities can be deferred and how long without affecting the overall project plan. Determine the least amount of time it takes to complete a project. Tell you about the latest and last time each action can start to manage your schedule. Each action is above each connection on the chart. For a separate path, insert the duration of each node to determine the total duration. The critical path has the longest duration. The aforementioned is a concept that is detailed about PERT vs. CPM for trade students. To find out more, stay tuned to BYJU'S. Best Differences in Commerce: PERT redirects here. For other purposes, see PERT (disambigation). PERT network schedule for a seven-month project with five importants (10 to 50) and six events (A via F). The Program (or Project) (PERT) assessment and review method is a statistical tool used in project management that has been developed to analyze and represent the tasks associated with completing the project. First developed by the U.S. Navy in 1958, it is widely used in conjunction with the Critical Pathway (CPM) method, which was introduced in 1957. The PERT review is a method of analysing the tasks involved in completing a project, especially the time it takes to complete each task, and determining the minimum time it takes to complete a common project. It includes uncertainty, allowing you to plan a project without knowing exactly the details and duration of all activities. It is more of an event-oriented method than a start-up and end-oriented method, and is used for the most part in projects where time is a major factor rather than cost. It is used in very large-scale, one-off, complex, non-standard infrastructure projects, as well as research and development projects. PERT offers a control tool that relies on arrow diagrams and node actions and events: arrows represent or the work required to reach events or nodes that indicate each completed phase of the entire project. PERTH and CPM CPM Tools because CPM uses one time estimate and one cost estimate for each activity; PERT can use three time estimates (optimistic, expected and pessimistic) and no cost for each event. While these are clear differences, the term PERT is increasingly applied to all critical trajectory planning. The history of PERT was designed primarily to simplify the planning and planning of large and complex projects. It was developed for the U.S. Navy's Special Projects Authority in 1957 to support the U.S. Navy's Polaris nuclear submarine project. He found apps all over the industry. An early example was that it was used for the 1968 Winter Olympics in Grenoble, which were used by PERT from 1965 until the opening of the 1968 Games. This model of the project was the first of its kind, a revival for scientific management, founded by Frederick Taylor (Taylorism) and later refined by Henry Ford (Fordism). The DuPont Critical Path Method was invented around the same time as PERT. PERT Summary Report Phase 2, 1958 Originally PERT was behind the task research evaluation program, but by 1959 had already been renamed. It was published in 1958 in two publications by the U.S. Department of The Navy entitled The Program Assessment Task, The Consolidated Report, Phase 1. and Phase 2. In a 1959 article in The American Statistician, Principal Willard Fazar, Head of Program Evaluation, U.S. Navy Special Projects Authority, detailed the core concepts of PERT. He explained: Using an electronic computer, the PERT process processes data that represents the main, final achievements (events) needed to achieve the ultimate goals; The interdependence of these events; and estimates of the time and range of time needed to complete each activity between two consecutive events. Such time expectations include estimates of the most likely time, optimistic time and pessimistic time for each activity. This method is a management tool that measures perspectives to achieve goals in time; Emphasizes hazard signals that require management decisions; Identifies and identifies both methodology and sluggishness in terms of flow or network of sequential activities that must be performed to achieve goals; Compares current expectations with scheduled completion dates and calculates the probability of meeting with scheduled dates; and simulates the consequences of decision-making options - before a decision is made. The PERT concept was developed by an operational research team staffed by booz Allen Hamilton; Lockheed Missile Systems Assessment Office; and the Program Assessment Division, Special Projects Office of the Department of the Navy. Guide on the use of management, June 1963 Ten years after the introduction of PERT in 1958, the American librarian Maribeth Brennan published published published bibliography with about 150 publications on PERT and CPM, which was published between 1958 and 1968. The origin and development was summarized as follows: PERT originated in 1958 with ... Design and planning for polaris rockets. Since then, it has been widely used not only by the aerospace industry, but also in many situations where management wishes to achieve its goal or to complete the task within time and cost; it came into popularity when the algorithm for calculating the maximum value path was conceived. PERT and CPM can be calculated manually or by computer, but they usually require serious computer support for detailed projects. A number of colleges and universities are currently offering training courses in both. Another tool has been developed for the PERT's work unit: the work breakdown structure. The breakdown structure provides the basis for a complete network, and the work breakdown structure has been officially introduced as the first element of the analysis in the basic PERT/COST. The terminology of Events and Action In the PERT chart, the main building block is an event with links to its famous predecessor events and successor events. PERT Event: A point that marks the beginning or end of one or more events. It does not consume time and does not use any resources. When it marks the completion of one or more activities, it is not achieved (not happening) until all the actions leading up to the event have been completed. Precursor event: an event that directly precedes any other event without any other event. The event may have several precursor events and may be a precursor to several events. Successor event: an event that immediately follows any other event without any other interference events. The event may have several successor events and may be the successor to several events. In addition to events, PERT also knows activities and sub-activities: PERT activities: actual performance of a task that requires time and resources (such as labor, materials, space, equipment). It can be understood as representing the time, effort, and resources needed to move from one event to another. The PERT cannot be implemented until the predecessor event has occurred. PERT Sub-activity: PERT activities can be further decomposed into sub-charge sets. For example, A1 activity can be decomposed to A1.1, A1.2 and A1.3. Sub-activities have all the properties of activity; in particular, sub-activity has a precursor or successor to events just like activity. Sub-activity can be re-decomposed into thinner grains. Time PERT identified four Time needed to perform the action: Optimistic time: the minimum possible time required to perform an action (o) or path (O), assuming that everything will continue than is usually expected pessimistic time: the maximum possible time required to perform the activity (p) or path (P), assuming that everything will go wrong (but excluding major catastrophes). most likely time: The best estimate of the time it takes to perform an activity (m) or a path (M), assuming that everything is going as normal. Expected time: The best estimate of the time required to perform an action (those) or paths (TE), given the fact that things don't always go as normal (implied that the expected time is the average time a task will require if the task has been repeated in a number of cases over a long period of time). t e o 4 m. p 6 display tefrac o4m'p'{6} T E ∑ i 1 n t i displaystyle TE sum,i'1'n'te_'i' standard time deviation : variability of time to perform the action (i.1'n'te_'i' standard time deviation : variability of time to perform the action (i.1 (UTE) σ te e p- about 6 σ T E and ∑ i 1 n σ t e e i 2 {6} display (beginning) Amount of 1 sq m {2} te_. PERT delivers a number of management tools with definitions such as: float or slack is a measure of the excess time and resources available to complete the task. This is the amount of time a project task can be delayed without causing delays in any subsequent tasks (free float) or the entire project (full float). Positive sluggishness will be indicative of an ahead of schedule; negative sluggishness will indicate a lag behind schedule; and zero sluggish will indicate on schedule. Critical Path: The longest possible continuous path taken from the original event to the terminal event. It determines the total calendar time required for a project; and, therefore, any delays in time on an important path delay the achievement of the terminal event by at least the same amount. Critical Activity: An action that has a total float equal to zero. Activities with zero free swimming are not necessarily on a critical path, as its path may not be the longest. Run time: The time by which the predecessor event should be completed in order to allow enough time for actions that must take place before the completion of a particular PERT event. Delay time: The earliest time by which a successor event can follow a specific PERT event. Fast Tracking: Performing more important actions in a parallel failure critical path: Reducing the duration of critical action The first step for project planning is to identify the tasks that the project requires and the order in which they need to be completed. The order can be easy to record for some tasks (for example, when building a house, the land must be assessed before the foundation can be laid), while difficult for others (there are two areas that need to be graded, but there are only enough to make one). one). time estimates usually reflect normal, untested time. Many times the time it takes to complete a task can be reduced for additional costs or lower quality. Example In the following example, there are seven tasks marked A through G. Some tasks can run simultaneously (A and B), while others cannot be completed until their predecessor task is completed (C cannot begin until Work A is completed). In addition, each task has three time estimates: an optimistic time estimate (o), the most likely or normal time estimate (m) and a pessimistic time estimate (p). The expected time (te) is calculated using the formula (o 4m and p) ÷ 6. Activity Precursor Time Estimates Expected Time Opt. (o) Normal (m) Pess. (p) A - 2 4 6 4.00 B - 3 5 9 5.33 C A 4 5 7 5.17 D A 4 6 10 6.33 E B, C 4 5 7 5.17 F D 3 4 8 4.50 G E 3 5 8 5.17 After completing this step you can draw a Gantt chart or a network chart. The Gantt diagram, created with Microsoft Project (MSP). Note (1) Critical path in red, (2) slack black lines associated with non-critical activity, (3) from Saturday and Sunday are not working days and are thus excluded from the schedule, some bars on the Gantt chart more if they cut through the weekend. The Gantt diagram, created with OmniPlan. Note (1) Critical Path highlighted, (2) slack is not specifically specified on task 5 (d), although this may be observed on tasks 3 and 7 (b and f), (3), since weekends are indicated by a thin vertical line, and do not take an extra place in the work calendar, the bars on the Gantt schedule are no bigger or shorter when they do or do not carry on weekends. The next step is to create a network chart manually or using a software diagram, a network chart can be created manually or using a software chart. There are two types of network charts: arrow activity (AOA) and activity on nodes (AON). Activity on site diagrams is generally easier to create and interpret. To create an AON chart, it's a good idea (but not necessarily) to start with a site called a start. This activity has a duration of zero (0). You then draw each action that has no predecessor action (a and b in this example) and connect them to the arrow from start to place. Further, as both c and d list a as precursor activity, their nodes are drawn by arrows coming from a. Activity e is listed with b and C as a precursor action, so the e node is drawn with arrows coming from both b and c, which means that e cannot begin until both b and c. so the arrow is drawn, connecting the action. Similarly Drawn from E to pm. A network chart created using Microsoft Project (MSP). Note that the critical path is Red. A node like this one (from Microsoft Visio) can be used to display the activity name, duration, ES, EF, LS, LF, and slack. The network chart itself, pictured above, does not provide much more information than the Gantt chart; however, it can be expanded to display additional information. Most common information is shown: Action Title Expected Duration Time Early Start Time (ES) Early End Time (EF) Late Start Time (LS) Late End Time (LF) slack In order to determine this information assumed that actions and normal duration times are given. The first step is to define ES and EF. ES is defined as the maximum EF of all predecessor activities if the activity in question is the first activity for which ES is zero (0). EF is an ES plus duration task (EF and ES - duration). ES for a start is zero, as this is the first action. Because the duration is zero, EF is also zero. This EF is used as an ES for a and b. ES for a is zero. The duration (4 working days) is added to the ES to get an EF of four. This EF is used as an ES for c and d. ES for b is zero. The duration (5.33 working days) is added to the ES to get an EF of 5.33. ES for c four. The duration (5.17 working days) is added to ES to get AN of 9.17. ES for d four. The duration (6.33 working days) is added to the ES to get EF 10.33. This EF is used as an ES for f. ES for e is the greatest EF of its predecessor activity (b and c). Since b has EF 5.33 and C has EF 9.17, ES e 9.17. The duration (5.17 working days) is added to the ES to get EF 14.34. This EF is used as an ES for g. ES for f 10.33. The duration (4.5 working days) is added to ES to get AN 14.83. ES for g 14.34. The duration (5.17 business days) is added to the ES to get EF 19.51. ES for finishing is the greatest EF of its predecessors activity (f and g). Since f has EF 14.83 and g has an EF 19.51, ES finishes 19.51. Finishing is an important milestone (and therefore has a duration of zero), so the EF is also 19.51. With the exception of unforeseen events, the project should take 19.51 working days. The next step is to determine the late start (LS) and late completion (LF) of each action. This will eventually show if there are activities that are slack. LF is defined as the minimum LS of all successor activities, except where the action is the last action for which LF is EF. LS is an LF minus the duration of the task (LS and LF - duration). LF for finishing is EF (19.51 business days), as this is the last action in the project. As the duration is zero, LS is also 19.51 working days. This will be used as an LF for f and g. LF for g is 19.51 business days. Duration (5.17 working days) is deducted from LF to get LS 14.34 working days. It's This. used as an LF for e. LF for f is 19.51 business days. Duration (4.5 working days) is deducted from LF to get LS 15.01 working days. This will be used as an LF for d. LF for e is 14.34 business days. Duration (5.17 working days) is deducted from LF to get LS 9.17 working days. This will be used as an LF for b and c. LF for d is 15.01 business days. Duration (6.33 working days) is deducted from LF to get LS 8.68 working days. LF for c is 9.17 working days. Duration (5.17 working days) is deducted from LF to get LS 4 business days. LF for b is 9.17 business days. Duration (5.33 working days) is deducted from LF to get LS 3.84 working days. LF for a is the minimum LS of its successor activity. Since C has LS 4 business days and d has LS 8.68 business days, LF for 4 business days. Duration (4 working days) is deducted from LF to get LS 0 working days. LF for a start is the minimum LS of its successor activity. Since LS has 0 business days and b has LS 3.84 business days, LS is 0 business days. The next step is to identify a critical path and possible slack the next step is to determine the critical path and if any actions are slack. A critical path is the path that takes the most time. To determine the journey time, add the duration of the task for all available paths. Activities that are slack can be postponed without changing the total time of the project. Slack is calculated in one of two ways: sluggish - LF - EF or sluggish - LS - ES. Actions that are on a critical path have a slack of zero (0). The journey of the adf is 14.83 working days. The aceg journey lasts 19.51 working days. The duration of begging is 15.67 working days. A critical aceg path and a critical time of 19.51 working days. It is important to note that there may be several critical paths (the project is more complex than this example) or that the critical path may change. For example, let's say that d and f actions take their pessimistic (b) times to complete instead of the expected (TE) time. The critical path is currently adf and a critical time of 22 working days. On the other hand, if C activity can be reduced to one working day, the journey time for aceg is reduced to 15.34 working days, which is slightly less than the time of the new critical path, please (15.67 working days). Assuming that such scenarios do not happen, it is now possible to determine the slack for each action. Start and finish are a mark and by definition have no duration, so they may not have slack (0 working days). Activity on a critical path is by definition zero; It's always a good idea to test the math anyway when drawing by hand. LFa - EFa No 4 - 4 - 0 LFc - EFc - 9.17 - 9.17 - 0 LFe - EFe - 14.34 - 14.34 - 0 LFg - EFg 19.51 - 19.51 - 0 Activity b has LF 9.17 and and and EF 5.33, so the slack is 3.84 working days. Activity d has LF 15.01 and EF 10.33, so the slack is 4.68 working days. Activity F has LF 19.51 and EF 14.83, so the slack is 4.68 working days. Thus, activity b can be delayed by almost 4 working days without delaying the project. Similarly, d activity or f activity may be delayed by 4.68 working days without delaying the project (alternatively, d and f can be delayed by 2.34 working days each). A completed network chart created using Microsoft Visio. Note that the critical path is red. As a project planning tool, the PERT chart clearly identifies and makes visible the relationship relationship (priority) between the structure of the breakdown of the work (usually WBS) elements. PERT makes it easier to identify a critical path and makes it visible. PERT facilitates the definition of early start, late start and slackness for each action. PERT envisages a potential reduction in project duration by better understanding of dependencies, leading to improved duplication of activities and tasks where possible. A large amount of project data can be organized and presented in the diagram for use in decision-making. PERT can provide a chance of completion before a given time. Disadvantages There can be potentially hundreds or thousands of activities and individual relationship dependency. PERT is not easily scaled for small projects. Network diagrams tend to be large and cumbersome, requiring multiple pages to print and requiring special paper. The lack of timeframe on most PERT/CPM graphs makes it difficult to display status, although colors can help, for example, a specific color for completed nodes. Uncertainty in project planning during the project, however, the actual project will never run as planned due to uncertainty. This may be due to ambiguity as a result of subjective assessments that are prone to human error or may be the result of variability resulting from unforeseen events or risks. The main reason why PERT can provide inaccurate information about the completion time of the project is due to this schedule uncertainty. This inaccuracy may be large enough to make such assessments unhelthes useful. One possible way to maximize the reliability of solutions is to include security in the baseline schedule in order to absorb the expected failures. This is called pre-emptive planning. Purely pre-emptive planning is a utopia; incorporating security into the base schedule, allowing for all possible violations, will result in a very large span of baseline. The second approach, called reactive planning, is to procedures for responding to failures that cannot be absorbed by the baseline schedule. See also Activity Chart Arrow Chart PERT Distribution Method Critical Project Management Chain Critical Path Float Method (Project Management) Gantt Chart Chart Precedent Method Project Network Project Management Project Planning Project Triangle Distribution PRINCE2 Links - b c Brennan, Maribet, PERT and CPM: Selected Bibliography, Monticello, Illinois, Council of Planning Librarians, 1968. page 1. a b Malcolm, D.G., J.H. Roseboum, C.E. Clark, W. Fazar. Application of the Research and Development Assessment Methodology, OPERATIONS RESEARCH, Volume 7, No. 5, September-October 1959, page 646-669 and the official report on the 1968 Winter Olympics. page 49. Access to November 1, 2010. (English and French) - U.S. Department of the Navy. The task of the program evaluation research, Consolidated Report, Phase 1. Washington, D.C., State Printing House, 1958. U.S. Department of the Navy. The task of the program evaluation research, Consolidated Report, Phase 2. 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