

## CPERT

(Excerpt from Book – Effective Social Innovation – Planning Guide for Changemakers by Jyoti Sharma, FORCE)

To illustrate how PERT can be used to plan activity sets in a non-factory situation, I use an article – ‘Measuring Process Effectiveness Using CPM/Pert’<sup>1</sup>, where it was used to help an organization facing the problem of providing additional parking space for its customers’ trucks. By reducing and stabilizing the process cycle time, the problem was solved, saving the company the cost of leasing more parking lots for the customers’ trucks. In addition, the customers were happy with less time spent in the company’s premises.

A manufacturing company in the commercial city of Lagos, Nigeria that produces household utilities was faced with the problem of parking space for its customers after the government of Lagos came with a new law prohibiting trucks and other vehicles from parking by the road side of major highways. The company had a parking lot for its customers, but because of limited space, some were compelled to park by the roadside outside the fence of the company. That meant that the trucks would now be impounded if parked on the roadside and would have to pay substantial fines to the government. This would have added to the cost of transacting business with the company.

The company wanted to prevent this. When the author studied the problem, he found that the trucks spend only a few hours at the premises of the company before they were loaded. There was a scope for solving the problem by eliminating congestion at the parking lot. The past one year’s data showed that the daily average time spent for loading a truck ranged from 70 to 140 minutes. The standard was of not more than 90 minutes for loading a truck. This showed that the performance of the process could be improved upon significantly.

As step 1 in PERT, the process activities, together with their durations, were identified and listed in Table 2. People involved in operations were asked to provide the estimated time for each activity.

TABLE 1 – LIST OF PROCESS ACTIVITIES AND THEIR DURATIONS

S.No	Activities	Duration
1	Customers bring Authority to Collect to Customer Service Manager. He works on it	8 minutes
2	Customer Service Executives prepare the invoice and delivery note	5 minutes
3	Delivery note is taken to the commercial store and stamped with authority to load after confirmation of document	3 minutes
4	Vehicle enters premises and proceeds to weigh bridge to be weighed in	10 minutes
5	Delivery note is given to loaders contractors and vehicle is loaded and checked by security checkers	28 minutes
6	Driver proceeds to commercial store and signs out	4 minutes
7	Delivery note is taken to weigh bridge and vehicle is weighed out	15 minutes
8	Delivery note is taken to credit control for validation	4 minutes
9	Auditors check and sign necessary papers	5 minutes
10	Security at gate check and the vehicle leaves the premises	8 minutes

In next step, a brainstorming session was held to identify the right operational relationship between the various activities i.e. what was the sequence in which activities needed to be done or could be done.

This led us to the result in table 7.

<sup>1</sup> Ajiboye Sule Adegoke (2010), Measuring Process Effectiveness Using Cpm/Pert, International Journal of Business and Management Vol. 6, No. 6; June 2011  
doi:10.5539/ijbm.v6n6p286

TABLE 2 – PRECEDENCE RELATIONSHIP OF PROCESS ACTIVITIES

Activity	Description	Precedence Activity
A	Customers bring Authority to Collect to Customer Service Manager and manager works on it	-
B	Customer Service Executives prepare the invoice and delivery note	A
C	Delivery note is taken to the commercial store and stamped with authority to load after confirmation of document	A
D	Vehicle enters premises and proceeds to weigh bridge to be weighed in	B
E	Delivery note is given to loaders contractors and vehicle is loaded and checked by security checkers	C,D
F	Driver proceeds to commercial store and signs out	E
G	Delivery note is taken to weigh bridge and vehicle is weighed out	F
H	Delivery note is taken to credit control for validation	F
I	Auditors check and sign necessary papers	H
J	Security at gate check and the vehicle leaves the premises	G,I

Based on the brainstorming session and Table 7, Figure 38 gives the network diagram:

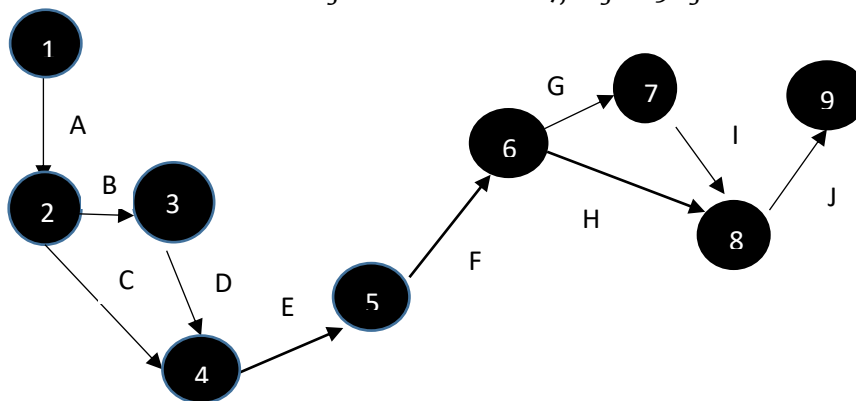


Figure 1 – Network of activities

Figure 39 showed that some activities could take place at the same time. For example, activities B and C could take place at the same time. Similarly G and H could also take place at the same time. While vehicle is being weighed out, the delivery note can be validated at the credit control, and the auditor can check and sign necessary papers. They found that these changes could be made at no extra cost to the department.

Figure 39 also gives the 'Critical Path'—the planning pathway which indicates the minimum amount of time required to complete all tasks. If these activities do not move as planned, then there will be time overruns. So the production planners pay special attention to activities along this path. It is indicated with bold arrows in the network below.

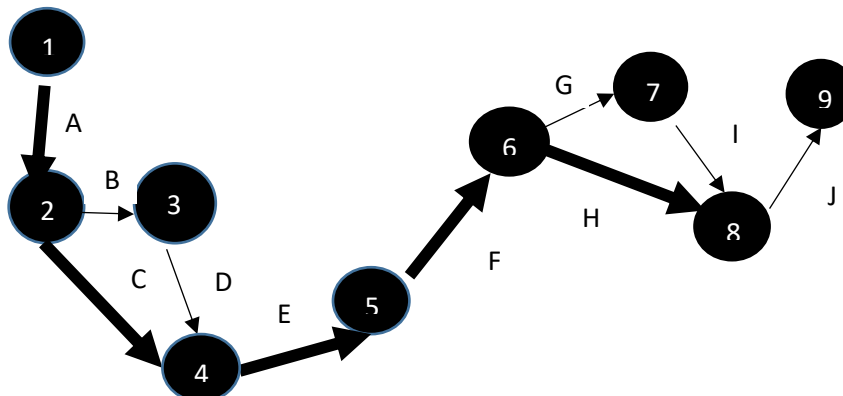


Figure 2 – Network of activities

The marketing department adopted this model and within a few weeks of its use, the effect became visible. Congestion at the parking lot was completely eliminated and the fear that trucks may park on the highway was totally removed. In addition the company had no need to lease or acquire bigger parking space for its customers' trucks.

At its simplest, PERT can be done by following the following steps.

- i. **Break the process into independent sub-processes** i.e. sets of activities that can be done independent of each other and are manageable. We need to display your work breakdown structure as lists, tables or an outline.
- ii. **Establish dependencies** - Some activities will depend on the completion of others. Listing the immediate predecessors of each activity will help us identify the correct order. To correctly identify activities and their precedence, we need to ask these three questions for each activity on your list from step one:
  - Which task should take place before this task happens?
  - Which tasks should be finished at the same time as this task?
  - Which tasks should happen right after this task?
- iii. **Draw the Network Diagram** - Once we have identified the activities and their dependencies, we can draw the network diagram. The network diagram is a visual representation of the order of our activities based on dependencies. As the network diagram in figure 38 shows, there are some activities that can be done only in sequence while there are others that can be done in parallel, Parallel activities are those where the status of one does not directly impact the status of the other.

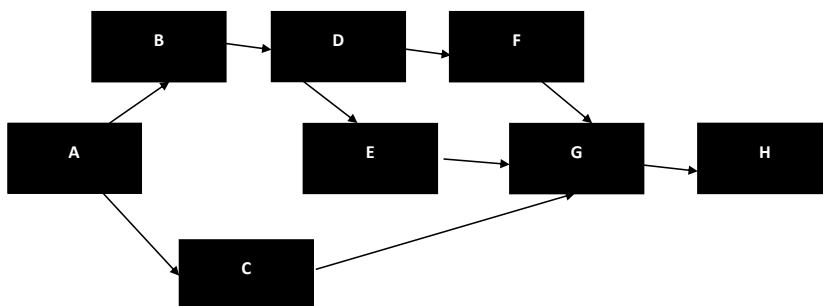


FIGURE 3 - DIAGRAM SHOWING PRECEDENCE RELATIONSHIP BETWEEN ACTIVITIES

- iv. **Estimate Activity Completion Time:** Estimate the time required to complete each sub-activity.
- v. **Identify the Critical Path:** The critical path is the longest path of the network diagram. It shows the critical activities, which if delayed, will lead to time over-runs in project management.

Viewed differently, the Critical Path derived from PERT allows us how to calculate the **shortest possible time** in which our work can get done. In the network diagram, if we identify the shortest route in which the potential of doing activities in parallel with each other is maximized, that gives us the shortest project completion time possible

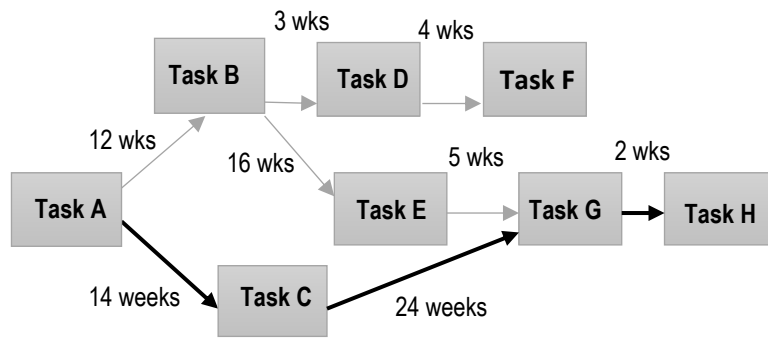


FIGURE 4 - THE CRITICAL PATH

### CPERT – The Changemaker’s PERT