

# How Do Project Managers Evaluate and Plan for R& D Project

Usman Ali Khan

**Abstract**—Various types of projects, including software development research project, product development, construction, engineering, plant maintenance and others can apply this critical path method (method of scheduling). In order to solve the hurdles one faces while calculating critical path cannot be denied. In order to resolve the issue there exist a unique set of coordinated scientific activities with start and end point reach specific performance objective within the defined time limit of research & development project. Often research & development projects, in such enterprises desired attention is not rendered on actual research management neither during its execution nor its commencement. As a consequence the duration goes beyond the time limit which in turn burdens the assign budget, shortage of resource and time. The usefulness of the application of CPM can't be denied. Some of the major uses are identifying the dynamic activities that can be executed simultaneously & prioritize the different levels of performance to be done within a certain time limit. The case study describes research & development project for research students. Nonetheless, the outcome of the application to the assignments displays expected project duration is fourteen (14) weeks as per the schedule of 24 week, indicating a reduction of around 41.67%.

**Index Terms**— Project management, critical path analysis, CPM scheduling.

## I. INTRODUCTION

In a project one cannot deny the crucial role of duration, number and relation of tasks. Therefore we used Critical Path Method (CPM) technique to reduce the project duration. Critical Paths are one or more paths in a project having the longest duration or the zero slack time for all activities of the path. Finding and reducing the critical path can reduce the total project duration. At the inception of any scientific research and development project, the ideas are administered, delineated and then further processed and

clarified using literature survey and review. This in turn culminates into a scientific research proposal. Therefore in order to achieve the objective of a research and development project, one has to have a comprehensive analysis, strategy and management. Precisely, the research layout is an essential part of any research management process and a deciding factor for its success and failure. But, the fact is this planning & management are considered insignificant and very little attention is given to it. Consequence the duration of R & D project overshoots the scheduled duration which leads to stress on budget, resources and time. CPM scheduling in the management of R & D project is still limited. Some of the advantages of the application of CPM include: (i) identifying the dynamic activities that can be executed simultaneously; (ii) prioritize the different levels of the performance to be done within a certain time limit (iii) act as a scaffolding for project monitoring tools like weekly or daily reports or organizing schedules (iv) the effects of changes or delay the ongoing project can also be measured. Last but not the least, CPM scheduling also regulates the total duration of the project including its early start time (ES) and the early finish time (EF) for each activity using for each activity using a forward pass.[1-2].

## II. THE CHALLENGES OF INDEPENDENT RESEARCH

The prerequisites to complete an independent R & D project within time limit are the completion of multiple, connected activities, and multiple deadlines one has to be prepared to meet the challenges and efficient enough to respond dynamically to any further challenges you might face during the project & at the same time, your research project can possibly be just one of a number of key activities that you are involved in at that time especially so for a research project.

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**Table 1: Planned Activities**

ACTIVITY	CODE	DURATION	PREDECESOR
<b>Choose your research area</b>	A	2	NONE
<b>Conduct preliminary research (scope out the topic) &amp; Decide your research topic</b>	B	1	A
<b>Decide your methodology</b>	C	5	A
<b>Submit/present your research proposal for approval</b>	D	4	A
<b>Finalize your topic &amp; methodology</b>	E	3	B,C
<b>Conduct you research (fieldwork)</b>	F	2	C
<b>Analysis/data processing</b>	G	3	D
<b>Writing up</b>	H	2	E,F,G
<b>Submission</b>	I	2	G,H

**III. THE COMMON NATURE OF A RESEARCH PROJECT**

The key elements of a research projects are similar irrespective of their academic discipline and the area on which research is to be done. This fact holds for all fields of lindy be it science, social science or arts &humanities because of deliverables (i.e. your research) are common across disciplines.

**IV. THE STRUCTURE OF A RESEARCH PROJECT**

At a basic level, a research project categorized into nine activities that need to be done in order to complete the assignment: Choose your research area, Conduct preliminary research (scope out the topic) & Decide your research topic, Decide your methodology, Submit/present your research proposal for approval, Finalize your topic & methodology, Conduct you research (fieldwork), Analysis/data processing, Writing up, Submission

**V. MANAGING YOUR RESEARCH PROJECT**

The complex project that involves several activities and deadlines requires some form of management. Using simple project management techniques will allow you to keep control of your research project. One simple but highly effective technique is to produce a Gantt chart. This provides you with a clear visual plan of your research project, based on scheduling the different stages of your project against a time base. The underneath Figure 1 & 2

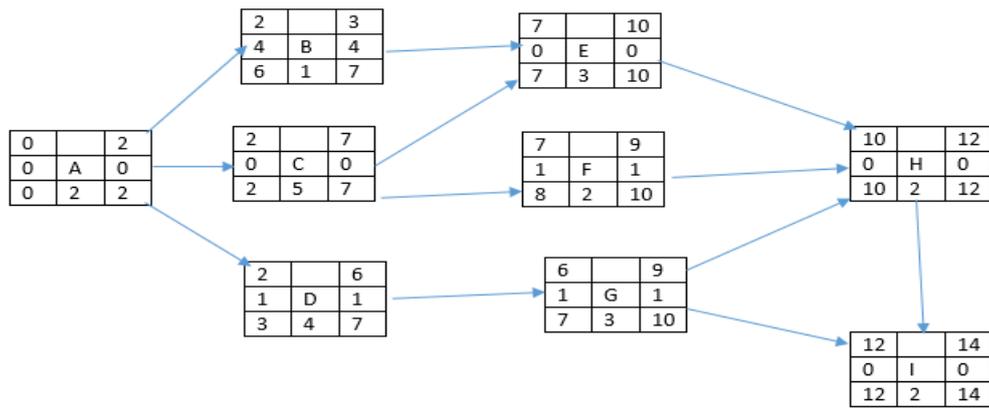
are based on nine basic research project stages in week 24. [3]

**VI. DESCRIPTION OF CASE STUDY**

The benefit of the application of CPM scheduling in managing the research projects. Planned activities according to the approved research proposal presented in the above table-1. [4-6]

**VII. RESULTS AND DISCUSSION**

Figure-1 display the AON network with forward and backward pass used in the project is the path ABCDEFGHI shows the time period of the assignment on the last activity. The last activity also shows the time reduction by 41.67% of actual duration. It conveys not only the depletion in time but a considerable decrease in the cost &material as well. In addition to that consummation of the r & d project before the deadline would prevent any kind of extra pressure on the financial estimate and other resources. It also presents the energy to be wasted without compromising at the quality of the final product. Therefore if the research project is resource constrained, then there will a delay. But if the case is reversed as the present study, it would be done before time which is beneficial and profitable in all aspects. The noteworthy point is SL and ES are inversely proportional to each other. To conclude, during the unanticipated condition when the research project is in process, variation mat occur in the time of each activity. [1]



**LEGEND**

ES		EF
SL	ID	SL
LS	DU	LF

ES- Early Start Time		EF- Early Finish Time
SL- Slack Time	ID- Activity Identification	SL- Slack Time
LS- Latest Start Time	DU-Duration	LF- Latest Start Time

Figure 1: AON Network for the project with forward & backward pass

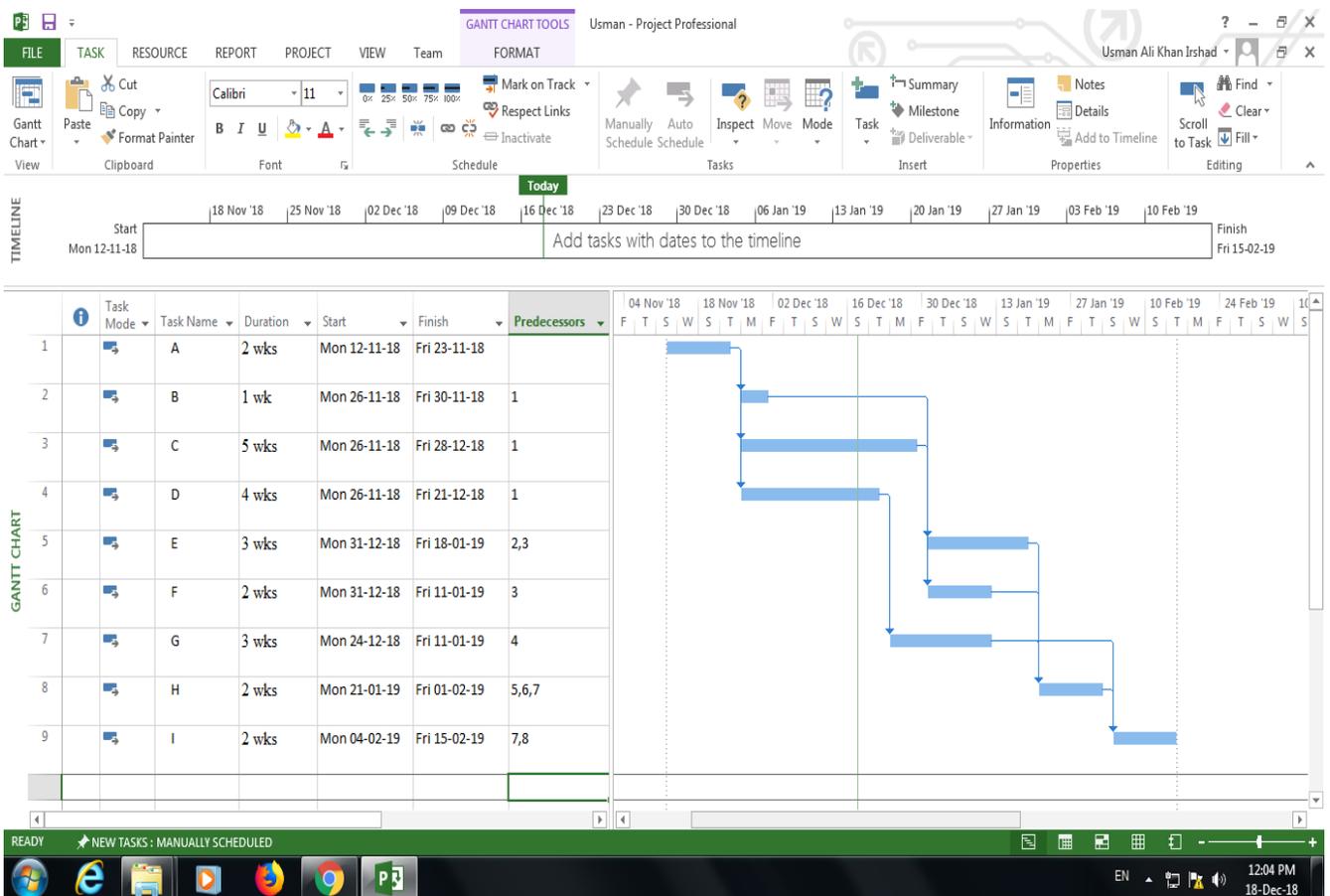


Figure 2: Fourteen week scheduling

### VIII. CONCLUSION

As the need to meet deadlines becomes more important, producing better and stable project plans become imperative. We can see that the critical path method is very appropriate and effective for determining activities that can lead to R & D project delay. Essentially, without exception every researcher hankers to consummate his project within the time limit, and identification of project bottlenecks plays a major role for this purpose. A typical project consists of activities which are related to rational or physical precedence relations. The result of this article shows that the R & D project could be completed in fourteen (14) weeks instead of the scheduled duration of twenty-four (24) weeks, a reduction of about 41.67%. As stated earlier also, if the duration of the project is minimized, It will automatically reduce the tension on finances & resources and consume energy without compromising the quality of end product. Therefore CMP scheduling should apply to the R & D project to make them more economic term of time management.

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