CHAPTER 2

REVIEW
OF
LITERATURE
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REVIEW OF LITERATURE / THEORETICAL ORIENTATION

The chapter entitled “Review of Literature” has its own importance and utility in research process. Inspite of exhaustive search made by the author, few references could be located particularly in the area of home science. Whatever literature could be located has, for sake and convenience in its presentation broadly been divided into following sections.

1. Importance of time as a key input in home management.
2. Factors effecting utilization of time by the homemakers for completion of home activities.

1. Importance of time as a key input in home management.

Muntz (1953) opined that today’s homemaker lives in a world completely different from that of her mother and her grandmother. If the homemaker has to combine the activities outside and inside the home and still discharge her duties satisfactorily without great strain on herself, she must manage her time efficiently.

Gilbreith, Thomas and Eleanor (1954) stated in their book “Management in the Home”, point out that a homemaker person has three basic resources at her disposal time money and energy. The homemaker knows her own limitations in money, with the aid of labor saving appliances and improved and improved working conditions and habits, she has been able to schedule her time to better advantage.
According to Martlöff (1954) effective use of time helps the homemaker to develop a smoothly operating household. The homemaker can save time in cooking by adopting simplified method in food preparation. She herself can find out the best way to do a task. Once the quickest and best method has been found and practised it will soon become a habit, thus enabling her to complete the task with a minimum of fatigue.

According to Openheium (1955) time is the raw material of life everyday unwraps itself like a gift bringing us the opportunity of spin a fabric of health pleasure and context. The time forms the framework in which various activities and work takes place.

Morgan (1955) showed importance as “Time is money”. Time cannot be saved like money, neither it can be borrowed. Time passed once cannot come again. Therefore homemaker has to manage all her activities within the limits of time. Thus management of time is important.

Hall (1958) said that despite the advance a homemakers cannot expect to push a button and have atomic energy to perform household services in the entirely. Home making is becoming highly technical occupation that demands skill and training in the use of equipments and up to date information.
Haffman (1960) reported that the husband of working women participate more in household tasks than husband of women who do not work. The author speaks of growing egalitarian sun in modern marriage. Husband also do a lot of work in the home including many job which are not at all traditional men’s ones. There is now no sort of work in home strictly reserved for the wives even clothes washing and bed making. Still ordinary thought of as women’s job, more frequently mentioned by husbands as things they did as well. The extent of sharing probably still increasing.

While specifying the multiple responsibilities of the homemakers, Devdas (1965) opined that the homemaker has a diversified career as cook, maid, Gardner, tailor, doctor, nurse, banker, accountant, mother, wife and counselor. In fact the role of woman in the family is comparable to that of a business executive.

Starr (1965) opined that satisfactory use of appliance includes their correct selection arrangement operation and care so that the homemakers may accomplish the greatest amount of work in the shortest possible time with a minimum of efforts.

Rains (1966) felt that co-coordinating tasks and developing new method can eliminate waste of time. The task of meal preparation should be analyzed and new procedures should be continuously used to save time.
Stield (1966) opined that the labor saving equipments used in the home required to do the task, the number of operations involved, the omission of parts of the work the amount of physical work involved and achievement of the standard of quality by the worker.

Goodyear and Klohr (1967) stated that if the homemaker has to combine the activities outside and inside the home and discharge her duties satisfactorily without great strain on herself, she must manage her time efficiently.

Devidson (1968) stated that in order to get satisfaction and good returns, time should be used in right way. So working to definite plan is essential. Otherwise there is indeed no prospects of success in the time management.

Krishna (1968) reported that homemakers after finishing their morning household duties generally see the TV and then gets very little time to take rest because then she has to do other duties and some planning in advance for evening meal preparation etc.

Tate (1969) said that a good homemaker has a plan for work. The old saying “Time and Tide wait for no man” is true for the homemaker. Time like money if invested wisely brings good returns and therefore it is need to be budgeted.

Buras (1969) aptly remarked that, “Today’s homemakers has the advantages of having tireless reliable uncomplaining
help in the form of new appliance and others home making aids to save the time and energy.

*Singer* (1969) stated that modern homemaker plays various roles. As a manager she guides various activities and makes numerous on the sport decisions. As a family member she shares the activities with others. As a mother she shares her time, energy and emotions with her children. As a wife she joins in doing things with and for her husband. As an individual she may enter into political, social political.

*Peckham* (1970) said that skillful management of time and energy helps to achieve the most out of the time spent in preparing food. Labor saving devices will save energy, time and make job easier and satisfying. Some equipments will require skill to operate, perhaps if the homemakers lack the skill when using the equipments it will demand more energy and time.

According to *Pecc* (1970) many factors determine the capacity and nature of equipment. They are family size, family composition income and other facilities.

*Pickeet* (1970) opined that the labor saving device has proved a boon to modern homemakers because of labor saving devices, the activities which are found to be monotonous, tedious and laborious have turned into convenient and easy going because of this some liked activities turned to the most liked activities.
Devki and Rajgopal (1970) said that good management demands that everyday household tasks are performed with a reasonable amount of ease and efficiency. The principles of management have a tremendous impact upon the practice of time management simplifying and improving it.

Picker (1970) said that family living and management have changed, the home are made easier by mechanical equipments and by the better materials.

Vasu (1974) reported that the use of electrical appliances in the home derives its stimulus from the concept of work simplification in the home which grew up in the western countries during the years following the two world wars and is mow coming up in the India.

Sathyavathi (1976) stated that home was the world of traditional wife but today home is one aspect as her, confines have enlarged beyond the home. Women themselves are not satisfied with their tradition household work but wish to step put of their homes for education and employment. It is one of the popular characteristics of women that they are able to attend the so many things at one time.

Parthasarthy (1976) stated that a woman in modern India has to play a double role of looking after the house i.e. taking care of her husband and children as well as her work in the office. The burden
and responsibilities of women in contemporary life have to be carried out satisfactorily not only for the welfare of women themselves but also for the welfare of men and children.

Sethi (1979) is of the opinion that time strategy must well be controlled and synchronized with other managerial acts. Although time is the most precious and self limiting managerial input, it still remains a major unattained frontier in the Indian family.

Pandey (1985) stated that various media such as newspapers, magazines, radio, posters, communication medias are very much helpful for the development of homemakers personality, homemakers household activities especially the management of time.

Devdas and Pushpa (1987) opined that time is an important resource because management concepts and behaviours cluster around it. It is one resource with the unique characteristics of being available in same amount for all.

According to Sharma (1994) the value of time of our obligation to spend every hour for some useful and are what few minds properly realize and those who have the highest sense of obligations in this respect sometimes greatly misjudge in their estimate of what are useful and proper modes of employing time.
2. Factors effecting utilization of time by the homemakers for completion of home activities.

Wilson (1929) stated that data show a 16-fold difference in the amount of time a mother spend in care of family members when a household with a child under age 1 (15.56 hrs per week) is compared to a household with children ages 6 to 14 and 15 to 18 (58 minutes per week).

Sorokin's (1939) stated that the use of time by 22 men and 81 women, relief workers under the Works Progress Administration, offers a breakdown of leisure activities separate from physiological and economic need.

Bull (1944) stated that neither rural nor urban homemakers worked more than 8½ hours daily, the working day (Sundays excepted) of the former stated about 6:30 A.M. and closed at 8:00 P.M. a stretch of 13.5 hours.

Gross (1954) reported that the urban homemakers whose children were of school age showed a range of two to five interruption per day, consuming a total of about one-half hour of time.

Wiegand (1954) stated that the entire group of homemakers averaged for week days 9.2 hours or 38 percent of their time on work, 8.4 hours or 35 percent on sleeping and resting, and 6.4 hours or 27 percent on all other activities.
Wiegand (1954) stated that agree in general on the rank order of time spent on groups of household activities and on the approximate time spent on each group. Also, total weekly times are fairly in accord, ranging from 47 to 52 hours. In the 1950’s two careful studies were published.

Wiegand (1954) stated that somewhat comparable studies of patterns of time use in farm household have been made at intervals of about 25 years and 15 years. These studies show marked similarities but also changes in time patterns over the years.

Wiegand (1954) stated that he shows a daily average for fill-time homemakers of approximately 4 to 5 hours spent on community activities and other leisure.

Wiegand (1954) opined that food preparation and cleaning fell slightly from 3.3 hours per day in 1936 to 3.0 hours in 1952, and care of house fell markedly from 2.7 hours to 1.4 hours, the later change probably due to fewer wood and coal stoves and to better equipment. Increase came in time spent on purchasing and management.

Cowles and Dietz (1956) reported that the larger the household the greater were the hours worked by the homemaker and by the other members of the household. Food preparation and clearing away occupied first place in all of the studies in amount of time used, the actual numbers of house put in by the homemaker showed some decline. The time spent per week on purchasing and management, and on care of
the family had considerably increased, judging by the results of the Wisconsin study as compared with earlier work.

Walker (1957) stated that the amount of household work done in one hour under average conditions by an average workers. The work load is the sum of work units like meal preparation, physical care of children, washing clothes, ironing clothes and regular weekly care of house.

Warren (1957) observed that women use approximately 7 1/2 hours per day for homemaker, unless they are also attempting to work many hours per week outside of their home. The woman who works part time in the labor force indicated that she may try to do all the homemaking activities that are done by women not in the labor force. Therefore, the women who work outside of the home apparently use as much as 11 1/2 hours per week day for all work and those not working outside the home have about 9 hour working period on week days.

Rusk (1961) opined that one of the responsibilities of the homemaker is to plan household work in such a manner as to save time, energy money and space. The different activities performed in the house involve different types and combination of effort and energy.

Deacon (1962) stated that resources commonly referred to in home management are “not only time, energy, money and material goods but also knowledge, interests, abilities, skills, attitudes of
family members, and community resources”. Except for an understanding of, and a facility with, management procedures, the resources of knowledge, skills, and abilities used in homemaking are acquired through the other specialized areas in home economics. Money, time, and energy the remaining resource terms, have been most frequently associated with home management with good reason. Because they are evaluative and permit the study of interrelationships, they provide meaningful tools for making management interpretations in an integrative sense.

Shamier and Tharachandrika (1971) have stated the low cost houses in order to judge the energy saving features.

1. Selection of Household Tasks :-

The maximum time consuming activity namely cooking and cleaning up were selected for the study.

2. Selection of Low Cost Houses:-

The 2 low cost houses consisting of 2 and 3 rooms were selected for evaluating their labour saving structural features.

3. Selection of Menu:-

The menu pattern of the families were maintained by the homemaker for a week.

4. Evaluation of working areas in the kitchen for their energy saving features.

Ogale and Ranawat (1973) reported that more homemakers belonged to small families with middle income. The findings revealed that the range of leisure time available to the respondents was one to nine hours per day, with a mean of 4-2 hours. The
average time available to the employed homemaker was 3.2 hours, ranging between one to size hours per day. The unemployed subjects received an average of 5.3 hours of leisure. The help available to the homemaker and the numbers of time saving appliances possessed by the homemaker affect the availability of leisure time of housewives, specially that of the employed ones. The leisure time available was more to the homemaker who belonged to lager families or had more time saving appliances or help available. The employed homemakers spent the largest percentage of their leisure time on intellectual activities, whereas the unemployed homemakers, on social activities. Planning of leisure time activities was more, prevalent among the employed homemakers.

**Dhesi and Sandhu** (1975) opined that age of homemaker had a direct effect on the utilization of time in household activities during four days. The homemaker belonging to the age group of 30-39 years spent 19.4 hours on food preparation and those belonging to the age group of 40-49 years and 50-59 year spent 20.5 hours and 20.1 hours respectively but the age group of 60 years or above spent comparatively less time i.e. 18.0 hours during four days.

**Dhesi and Sandhu** (1975) they have further reported that with the increase in family size, time spent on all the household activities also increased. The smallest family size of two members averaged about 17.5 hours on food preparation, whereas the largest family size averaged 22.5 hours during four days.
Dhesi and Sandhu (1975) farm families spent the largest amount of time i.e. 73.4 hours, employees 69.2 hours and non-employees 66.8 hours during four days for household activities. Farm families spent the maximum time on food preparation i.e. 22.5 hours, whereas non-employees averaged the minimum time i.e. 18.4 hours.

Dhesi and Sandhu (1975) and further stated that homemaker belonging to joint families spent 71.6 hours, whereas those belonging to nuclear families spent 66.4 hours for household activities. Homemaker from joint families spent more time in all the household activities, as compared to homemaker belonging to nuclear families except care of clothing and resting. But on an averaged, both the occupational groups spent the same time for recreational and social activities, gossiping and hobbies.

Walker and Woods (1976) noted that total time use in physical care of children increased as age of youngest child was lower, regardless of the number of children employment or type of house occupied.

Theoretical Orientation:-

As a matter of fact review of literature is important and useful chapter presenting there in findings of earlier researches. Findings collected in terms of references assist in shaping the methodology, formulating hypotheses and supporting the findings emerged out of the present investigation. In the present case however inspite of an
exhaustive search made by the author she could not come out with a systematic and comprehensive studies in related fields in general and in the area of home science in particular. Author, therefore, thought it appropriate to acquaint readers with the theoretical background of the PERT, which is the principal focus of an enquiry in the present study. Information relating to various aspects has been, therefore, presented under the caption "Theoretical Orientation."

Each of us has same amount of time allotted to us. Why is then that some people seems to have more time than others? Why it is that some people are able to accomplish much more than others in the same allotted time. What do we do about it and what must be done. These are some of the points probably bothering the individual many a times. This calls for consideration and understating the concept of ‘Time Management’ in its real perspective.

In calculating the importance of time somebody has rightly stated that, ‘The man who kills the time is killed by the time’. It is in this context significance of time in the walk of life needs no special emphasis. Individual therefore thinks of something, which will provide him with daily goal that have priority and sequence at any specific time. He constantly looks forward to these methods and techniques, which help him in goal oriented and objective specific planning, scheduling and controlling functions. The concept of Network planning and critical path analysis will be of immense use to him or her. Network approach to action planning is a major advancement in the management science particularly in the area of decision-making process.

Network analysis provides solutions to all management problems and also provides additional information paving
for better decision-making. Application of Network technique as an aid to management of development project is beyond doubt have been widely in use in the execution of large investment projects in the recent years. Needless to state that its use and applicability has been established and proved useful to solve not only phenomenal problems such as missile and space travel but also simple problems in nature and cost.

In view of their importance and utility Network Techniques are gaining popularity in the area of construction, agriculture and management. With the advancement of science and technology new concepts are being introduced in almost every disciple. Home science, naturally, therefore, cannot be an exception to this. Time has been a matter of great concern to homemakers like others rather could be of little greater concern.

**Origin of PERT:**

In complex interrelated business activities the chief executive or an administrator constantly looks forward to those techniques or methods which help him in goal oriented and objective planning, scheduling and controlling function. The concept of network planning and critical path analysis have been of immense use. Network approach therefore to action planning is a major advance in management science, particular in the area of decision-making process.

Network analysis provides solution to all management problems and also provides additional information for better decision-making.

Administrative deficiencies are many and varied. Deficiencies in administrative apparatus can be removed partly by
making deliberate structural changes and partly by developing skills required to manage the programs.

Of the many management techniques available management models are by far the most useful. Then include variety of scheduling techniques such as Program Evaluation and Review Technique and Critical Path Method etc.

Program Evaluation and Review Technique (PERT) and Critical Path Method (CPM) are use to plan and analyze program that involve sequencings of large number of tasks designed to accomplish desire objectives. Technique of PERT is being extensively used to solve not only phenomenal problems such as missile and space travel but also simpler problems costing few hundred rupees.

**Program Evaluation and Review Technique (PERT)-What it is?**

PERT an acronym for program evaluation and review techniques represent a significant step in the development of managerial science. PERT is a management planning and control tool for defining and integrating what must to be done to finish complex jobs in order to meet deadline.

It is a system for diagnosing and anticipating the integrated influence of time, resources and technical performances for achieving significant objectives.

PERT system measures and uses time as a common denominator for resource application and technical performance.

Decisions to undertake a project has to be necessarily followed by major volume of capital and other resources. The requirement is for planning scheduling systems that will be dynamic to
react instantaneously to any kind of changed conditions and continue producing the best-revised plans and schedules. In this content plan and schedule refer to project plan and activity schedule. Here the methodology adopted for network planning has been illustrated step by step.

**Making a Time Schedule:-**

Procedure to be followed in making a schedule-

1) List activities to be included- Make two list “Have to’s” and the “Should do’s” “Limit the length of “Have to’s” list.

2) Establish priorities on the two lists. Consider the time/value ratio that is the amount of time activity requires in relation to value received from it.

3) Estimate time required both quantity for an item and time when to be carried out and finished.

4) Bring total time needed and total time available into harmony.

5) Establish a sequence of activities.

6) Check meshing with other people’s plans where essential.

To make a realistic estimate of time required, it may be helpful to break a job down into its parts and make a time estimate on each part. Not only parts are easier to grasp and to check on latter, but they are psychologically easier to face.

**PERT Chart:-**

PERT charts illustrate activities, the time required for each, and the sequence. In addition, the PERT chart prescribes the critical path. Those activities in which any delay would likely result in a delay of completion of the task. After series of discussion with the director of
plans a programs about the need for an improved program evaluation techniques, it was resolved to explore the possibilities and to solicit proposals from out side organization “to design a system for program evaluation”. In december 1957 two contractors were chosen to participate in this operation research task-

1) Bozo, Allen and Hamilton, management consultants, the Lockheed Missile a space division.

Various possibilities were explored. Pertinent words were written on a blackboard. These words included-


It became obvious that the first letters in program Evaluation (PE) might lead to some thing. The Board soon contained other words such as-

PET - Program Evaluation Task
PEP - Program Evaluation Plan
PEST - Program Evaluation System Task
PEAR - Program Evaluation and Analysis Research
PERT - Program Evaluation Review Technique

2) PERT requires a moving schedule to properly status and monitor key mile stone dates and accurately predict key completion dates

3) PERT is not for every one, nor it is interested for use on all projects.

Therefore, the schedulers should use PERT with extreme caution.

PERT is a statistical technique applied to a Network schedule.
PERT immediately caught the eye. The problem of designing a system of
program evaluation was described by Program Evaluation and Review
Technique.
PERT was cute, catchy and bold and would prove useful and become
widely known.

Broadly speaking the benefits, which can accrued with the use of network may be listed as-

- It allows for the comprehensive view of the entire project and forces a through pre-planning of the task.
- Helps in establishing coordination among the departments participating in the venture.
- Identities trouble spots often in advance and pinpoints responsibilities.
- Through the plan schedules derived from network analysis delegation of power and responsibilities can be effectively enforced.
- Enables the plan to be revised in the best way to suit changed circumstances.
- It is very easy to estimates resources namely men, money and material for the project as its network is prepared in advance.
- Anticipate difficulties in advance and thus enable remedial measures to be taken well in time to avoid abnormal delays.
- Develop sales control at all levels with in the organization which is so indispensable.
• Make a decision to save in time in achieving objectives is of particular interest to those engaged in program for which time is a crucial and critical factor.

The following steps are used to develop a PERT chart:

1) DEVELOP A WORK BREAKDOWN STRUCTURE: Take a larger task (e.g. establishing a new ICDS Project) and list all the work that has to be done between the start of process and the time the task is complete (e.g. the ICDS project is fully operational). The level of details will depend on the extent to which the process is to be monitored but it is better to err towards as much detail as possible so as not to omit any important step. The first step is perhaps the most important. Be sure not to leave out any essential element of the process.

2) IDENTIFY ACTIVITIES AND EVENTS: An activity is a discreet task using resources over time. An event is usually to start or completion of an activity. It is a point in time, a benchmark, rather than anything that consumes time or money. From the detailed list prepared in the first step, decide which are activities and which are events.

3) DETERMINE SEQUENCE DEPENDENCIES: Look down the list prepared in the first step. Many of these activities will require that other activities have been previously completed. For e.g., you cannot begin training CDPOs until they have been
appointed. Note which activities have necessary precedents and what these precedents are.

4) DEVELOP PERT NETWORK: List the activities horizontally on paper so that any activity with a required precedent follows (or is to be the right of) that precedent. To make this look like a formal PERT chart put circles at the beginning and ending circles. These circles are events representing the beginning and ending or each activity. The lines represent the activity. Add other circles for other events not related to activities.

5) ESTIMATE TIME REQUIRED FOR EACH ACTIVITY: Look at each activity and estimate the time it will most likely require. Write that amount of time along the line representing the activity.

6) IDENTIFY THE CRITICAL PATH: Begin at the right side, where the large task has been completed. Choose the last task that has taken the most time. Now connect the activity to the precedent activity which required the most time. Continue this process across the page from right to left. Review this carefully reading left to right. The objective is to identify a sequence of activities which will accomplish the larger task in the shortest amount of time. Not all activities will be on critical path. Activities that have no required precedent can occur simultaneously with other tasks that are on the critical path.
7) PERFORMS NETWORK TIME CALCULATIONS: Add up the time allotments along the critical path. The sum will indicate the total time required to complete the project.

8) REPLAN: Try other routes through the activities always ensuring that no activity commences before its precedents are completed.

Note that the point of this exercise is to identify those activities which warrant the manager’s keenest attention. For e.g. training of CDPOs cannot begin until they are appointed. A poor manager, for e.g. might spend time acquiring equipment that will not be needed until much later, when, in fact, he should first assure that a building has been designated for the Anganwadi activities.

After listing the major activities to be included in a PERT, PLAN the next step is to ask the following questions about each of them.

- What must be done before this activity can be started?
- What activities cannot be started until this activity is finished.
- What activities can be done concurrently with this activity.
- What activities are floaters.

**Implementation:-**

After a time plan is made it must be implemented that is initiated and carried to completion.

Implementing may be done by the person who makes the plan or may be delegate in part or in whole to other.
Frequent checking of each part is important so that if necessary the situation can be remedied before it is too far from our hand. NETWORKS and certain basic Techniques used:

The heart of the PERT and CPM techniques lies in a construction and analysis of a flowchart of network made up of events and activities.

**Certain Basic Terminologies Used in Network and their Description:**

**Activity:**

An activity is the work performed to achieve a specific result for a task. It represents a job or project element to be completed, lying between any two events bring preceding and succeeding event. Each activity has a definite beginning and a definite end. It may or may not consume resources such as material, money and labor etc. but certainly consumes time. Activities are represented by letter. Activity names (or their codes) and their corresponding duration are shown above and below the arrow respectively. The length of the arrow need not have any significance and the arrow flows from left to right. It's direction indicates the sequence in which events occur.

![Diagram of Activity](image)

start of Activity       Finish of Activity
**Dummy Activity:**

It is defined as an activity which requires no time. It is used only to denote the relationship between two events and is represented by dotted lines.

![Dummy Activity Diagram](image)

**Events:**

Events signify accomplishment of goal but do require time and cost. They refer to the beginning or end of an activity.

![Events Diagram](image)

Start event  Finish event

They indicate the stages in the process of implementation of project. Events are represented by circle.

**Merge Events:**

An event which is jointly the successor event for more one activity if known as merge event.

![Merge Events Diagram](image)
Burst Event

An event which is jointly the predecessor event for more than one activity is called Burst event.

Critical Events:

The events for which earliest event time and latest event time are same are known as critical events.

Critical Activity:

It is an activity whose commencement and also the completion cannot be delayed without having to increase the total project duration.

Activity Time:

It is the duration of time from the beginning to the end of an activity.

Critical Path:

It is the path which takes the longest duration in the project network. The path joining all critical events is called critical path. Activities falling on it are known as critical activities. This represents the path which the objective can be achieved. In a network there can be more than one critical path. It is denoted by a thick line in the network diagram.
**Earliest occurrence time of an event:**

The earliest occurrence time of an event is the earliest point of time at which the event can be realized. The earliest occurrence time of the initial event is always zero.

**Earliest finish time of an activity:**

The earliest finish time of an activity is its earliest start time plus its own activity time.

**Earliest occurrence time of any event:**

It is the largest of the earliest finish times of all activities merging into that event.

**Latest occurrence time of any event:**

It is the smallest of the latest start times of all activities bursting from that event.

**Latest occurrence time of terminal event:**

The latest occurrence time of the terminal event is the same as its earliest occurrence time (as obtained by Forward Pass Method).

**Latest start time for an activity:**

The latest start time for an activity is the latest occurrence time for its successor event minus the activity time.
Latest Finish time for an activity:

The latest finish time for an activity is the same as the latest occurrence time of its successor event.

Total slack:

It is the difference between the latest finish time and the earliest finish time of that activity.

The activity for which the total slack is zero is referred to as critical activity.

Free slack:

Free slack of an activity is the difference between the earliest occurrence time of the successor event of that activity and the earliest finish time of that activity.

The total slack of any non-critical activity indicates the total time by which the activity can be delayed without affecting the earliest start time of any of the critical activities in the network.

It may be noted that critical path determines the project duration. If any time is to be saved on the project, it has to be on the critical activities only. Any delay cause in critical activities will increase not only the project duration but also the project cost. It is thus an important feature of the network technique.

Time Estimate:-

Once the project planner decides the use of network the next step centers around time required for execution of each activity or job, unfortunately under today's environment is that an exact
estimation of time a job will take is very difficult to arrive at. There is always a pressure to get a job done in desirable minimum time. The person immediately in charge of a particular operation while being quite willing to put an extra effort to get it done with minimum delays, unfortunately is dependent on so many under uncertainties, that is in majority of the cases, he is pressed for time. To take these uncertainties into account and since most PERT activities are non repetitive, and no past experience is available as a guide for future time estimate, three kinds of time estimates are generally obtained an optimized one (to), a most likely one (tm) and a pessimistic one (tp).

The most optimized estimate is the minimum possible time in which an activity can be completed under ideal conditions. To arrive at this time estimate better than normal conditions are assumed.

The most pessimistic time is the maximum possible time which an activity might require for completion, assuming or adverse conditions. However, condition such as natural calamities and strikes which are beyond managerial control are excluded in arriving at this time estimate.

The most likely time is the time in which an activity may be completed assuming all normal conditions.

A mean elapsed time (te) is computed as the weighed average of these three estimate times. There is much greater chance of the project being completed near the most likely time than there is that it will be completed near the most pessimistic time. Therefore, in arriving at the weighted average the most likely time is given greater weight age than are the most pessimistic or optimistic times. The following formula suggests weight age for arriving at an average.
te = to + 4tm + tp

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Geometry of network demands sticking to the principle of dependency that is activity cannot be stated until all preceding activities are completed. Thus every intermediate activity must have both a predecessor and successor.

Drawing the network is very important task in the PERT and CPM methods. If the network is not properly drawn these techniques will be of little use. Like any other plan it is dynamic. In fact the network is never finalized. As the project progresses network will have to be suitably altered to overcome newly discovered difficulties.

The CPM Model:-

The PERT is mostly used in projects comprising of non-repetitive activities like research and development for which no past experience is available. On the other hand the CPM model is used when some past experience is available about both time and cost required by different activities in a project such as construction programs. CPM is basically concerned with obtaining trade off between the cost and completion date for larger projects. CPM emphasizes the relationship between applying more men or other resources to shorten the duration of given job in a project.

The amount of time needed to complete various facts of the project is assumed to be known with certainty. The relation between the amount of resources employed and time needed to complete the project is also assumed to be known.