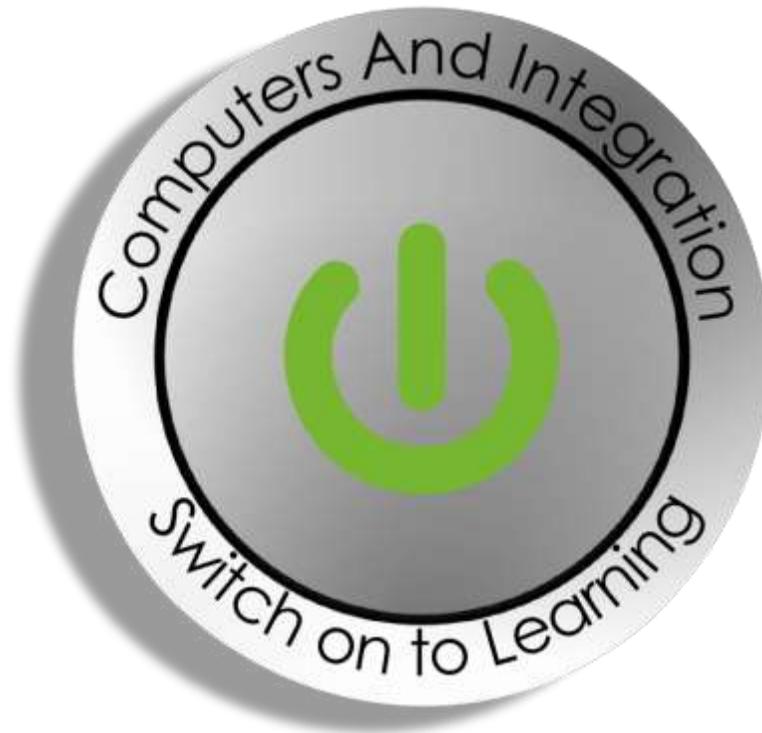


# How to conduct Project Management in small, medium and large scale projects

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## **Preface**

Project management is merely the organising of the tasks, or activities, that together form the basis of a project, and in addition project management is the creation of a logical methodical approach to undertaking a project, or multiple logically related tasks, in order to ensure efficient, effective and economic project management practice prevails.

Put simply, project management is the planning and managing of two or more tasks, and their associated resources, in order to achieve a pre-determined objective, with respect to time, cost, specification and quality.

In today's society, project management has useful properties. For example, projects can be managed and monitored with ease when there is a planned methodical approach in place, thereby ensuring efficient, effective and economic benefits in terms of time, cost, specification and quality. In addition, when problems occur within a project, an effective project management approach can endeavour to uncover what caused the problem, and indeed take steps to ensure that the problem can be remedied, and also, if necessary, impose preventative measures in order to ensure the problem does not occur in the future.

Overall, project management endeavours to ensure efficient, effective and economic project management practice prevails, with respect to the varying fickle parameters of time, cost, specification and quality.

Moreover, in industry there is often a requirement for projects to be completed within an allotted timescale and a pre-determined budget. As a result, the amount of time and money available tends to affect the quality of the end product. In summary, project management attempts to provide the maximum availability, including quality, for the least cost, hence the main aim of project management is to provide cost-effectiveness. Therefore, ensuring an organised methodical approach to project management simplifies and eases cost management, which ultimately contributes to cost-effective project management. Cost-effective project management subsequently results in lower costs for clients, and indeed greater functionality and availability.

## **Publication Scope**

The scope of this publication is to compare and contrast the three primary methods of project planning, and to determine contemporary project management planning methodologies based upon independent research, conjecture and analysis.

Moreover, this report shall outline and discuss the three traditional project-planning techniques, namely Gantt, the Program Evaluation and Review Technique, and the Critical Path Method, with respect to the advantages and disadvantages posed by each. Also, an illustration of those techniques will be demonstrated using the aid of an example project. In addition, modern contemporary project management solutions shall be discussed in terms of their methodological benefits and effects relating to the project management industry, with specific emphasis placed on project planning.

## **Traditional Project Planning Techniques**

### **Project Planning Methodology**

Project planning is the fundamental core component of project management as it provides the ability to efficiently and effectively organise all the activities and resources within a project, which subsequently ensures a systematic orderly project management approach, and as a result contributes to successful project management.

Moreover, over time there have been many approaches to project planning drafted, and each one has distinct advantages and disadvantages embedded into its characteristics. In addition, each approach tends to be a derivative of a combination of the three primary approaches to project planning: namely, Gantt, PERT (Program Evaluation and Review Technique) and CPM (Critical Path Method).

In other words, the key characteristics of most project planning approaches in existence today are derived from the three simplistic traditional project-planning techniques of Gantt, PERT (Program Evaluation and Review Technique) and CPM (Critical Path Method). Therefore, the historical significance of these three project-planning techniques is the reason for their analysis and discussion within this report.

Furthermore, in the following sections, the three most significant traditional project-planning techniques shall be explained; and illustrated using the aid of an example project in order to facilitate understanding of the project planning approach under scrutiny. Further, however, the example project in this case will be somewhat simplified, with the emphasis on demonstrating the important conceptual characteristics in relation to the three fundamental, traditional project planning techniques, and in addition, differentiating their diverse methodologies.

# Gantt

## Analytical Overview

Gantt is a project planning approach that was initially devised by Henry Gantt as an intuitive project planning methodological alternative to the inherent complex nature of the Program Evaluation and Review Technique (PERT) analysis.

The Gantt project planning approach achieves an intuitive aspiration by utilising a graphical mechanism for the conveyance of the activities involved in a project, their associated resources, and also the timescale related to the activities. Moreover, the graphical mechanism used is an activity versus time bar chart. This therefore means activities (tasks) are plotted against a timeline.

Moreover, each bar in a Gantt chart represents an individual activity (or task), and is plotted against time; time can be measured in any of the following formats: hours, days, weeks, months or years. Thus subsequently, due to the inherent intuitive nature of Gantt charts, they are typographically simple to construct.

Furthermore, due to Gantt's graphical representation of the activities involved in a project, their resources, and indeed the associated timescale, this approach thus serves as an intuitive, user-friendly, method of conveying project information, and thus improves readability of the project plan.

Consequently, improving readability of the project plan provides project managers with the ability to easily view the progress of a project, and in addition, ensure that the project as a whole is on schedule, and progressing in accordance with the project plan.

Also, improving readability of the project plan provides project managers with the ability to distribute an intuitive easy-to-comprehend replica of the project plan to each party involved in the corresponding project. As a result, this leads to everyone involved in the related project knowing what they need to do and when, thus increasing the efficiency and productivity of the project as a single unified whole.

In addition, project managers can utilise Gantt charts as an intuitive method of analysing trends throughout the project development period; subsequently this graphical analysis provides project managers with the knowledge of how a particular task, or project, could be improved in the future, or indeed at present, in relation to increasing efficiency, effectiveness and productivity. Basically, put simply, the reasoning for this is because analysing Gantt charts provides the ability to easily analyse the project as a whole; and in addition, analysing Gantt charts provides a user-friendly facilitation towards analysing all the individual component tasks, or bars, that are part of the project, or complete the Gantt chart.

Moreover, consequently, using a Gantt chart serves as an aid to the project manager, in terms of improving overall performance, in the sense that Gantt charts provide a

graphical (visually realistic) view of a project plan, thus subsequently they ease the process of analysing trends, and, as such, predicting patterns.

Furthermore, however, generally the usefulness of the information provided by Gantt charts is limited. Therefore, basically, the main purpose of Gantt charts is to provide an intuitive, easy to comprehend, graphically oriented project plan that everyone involved in the corresponding project can understand, and follow, at first glance, and also with ease. Thus consequently increasing knowledge of how the project should proceed, and in addition, therefore ensuring an efficient, productive project management practice prevails.

Basically, in summary, Gantt charts promote ease of use and intuitive interpretation, or understanding; however, conversely their inherent nature is inflexible and non-scalable. Moreover, in addition, there is subsequently little information regarding project information that can be derived from a graphically oriented Gantt chart.

Thus consequently, Gantt charts lack the flexibility required to efficiently control large projects. Subsequently, Gantt charts are well suited, and are commonly an effective method, in terms of productivity and cost, in managing small to medium sized projects.

## **A Gantt Chart**

The following diagram illustrates a Gantt chart created using Microsoft Project, Microsoft Project is computer software tailored towards the facilitation of computerised project management.

Further, in relation to time, the corresponding project plan has been devised in accordance with standard working times, for example, 9 to 5 Monday to Friday, merely to simplify matters.

Furthermore, in order to facilitate ease of understanding regarding the Gantt chart, an explanatory summary of the Gantt chart's graphical features shall be outlined.

Basically in summary, the blue squares, or rectangles, represent activities (or tasks); the black diamonds represent milestones (basically milestones represent completed tasks); and finally, the arrows illustrate the links between tasks (or alternatively their dependent precedence relationships). Also, the tasks themselves are listed in order, and in accordance with the corresponding project plan located in Appendix 1.



Moreover, project managers undertake what is commonly known as a PERT analysis, which basically provides the ability to simulate certain environmental situations and analyse their subsequent output. For example, using PERT allows project managers to estimate the least possible time an activity, or indeed a project, could take, the greatest possible time, and also the most probable amount of time an activity is likely to take.

Subsequently as a result, this provides project managers with the information necessary to conservatively predict trends, analyse situations with different environmental parameters, and to just simply, yet effectively, plan ahead, with the emphasis on assuring project development, and management, is maintained as efficiently, effectively, and economically as possible. Also, in addition, PERT charts are an effective mechanism in managing any size of project, although however they are especially useful towards the monitoring and management of large complex projects due to their inherent flexible, scalable nature.

Consequently, their pre-planning, flexible, and scalable approach can greatly assist a project manager when attempting to devise a more efficient, effective and economic project management practice, regardless of the size of the project. Thus, consequently leading to the ultimate goal, which is an increase in the likelihood, or probability, that a project will be successful.

However, conversely, due to the inherent complex nature of PERT charts, the level of comprehension required to understand them is subsequently increased. Therefore, to effectively utilise PERT charts, there is a requirement for well-trained project managers. Basically, put simply, the complexity of PERT charts compounds the level of understanding in relation to a project plan. Therefore consequentially, PERT charts generally reduce project-related comprehension for project workers, especially if the project is without a well-trained project manager.

Moreover, without a well-trained project manager, the risk of workers misunderstanding, or alternatively misinterpreting, what they need to do is increased. Consequently, worker productivity and efficiency is likely to suffer as a result of the bedazzlement, or confusion. Subsequently, the effect of inefficient workers is likely to consequently impinge negatively on the project as a whole, in terms of efficiency and effectiveness.

Therefore, in summary, PERT charts may provide creative control and flexibility in managing complex projects, but they require project managers to possess a comprehensive understanding of how to use them. Subsequently, well-trained project managers are required to manage large, complex PERT-oriented projects efficiently, effectively and economically.

Consequently, in addition, well-trained project managers are often well paid. Thus therefore, as a result, a PERT oriented project management approach can prove an expensive alternative to the intuitive, graphically oriented Gantt project planning methodological approach.

Further, in relation to creating PERT charts, their principle construction method metaphorically resembles that of network diagrams. Basically, network diagrams are symbolic of a spider's web, for example, lots of interconnections connecting together adjacent component parts of the diagram. To be specific, PERT charts are known collectively as event labelled network diagrams. Basically, the events represent activities, or tasks; and subsequently the activities are labelled accordingly on the network diagram inside event bubbles.

In addition, each so-called event bubble represents the completion of an activity; this type of event is commonly known as a milestone, and subsequently, milestones take no time to happen.

Moreover, basically milestones are merely representative of a completed task, and thus subsequently using milestones provides project managers with the ability to easily monitor project progression, and in addition, to instantaneously determine whether, or not, the project under management is on schedule. Consequently, therefore project managers can determine fairly easily where the project is at, in terms of progress, when analysing PERT charts. For example, one merely just needs to compare the most recent milestone reached against the timeline for the entire project to determine the location state of the project with respect to progression.

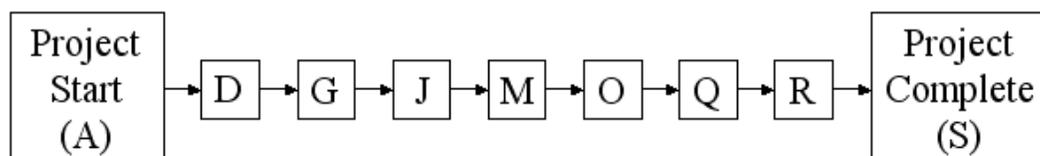
## A PERT Chart

The PERT chart that is illustrated corresponds to a simplified project plan. Therefore subsequently, the PERT chart in this case is all on one level due to the inherent simplicity of the project plan.

Further, conversely, usually PERT charts are constructed in a hierarchical fashion, where there are many routes through the project that can be analysed.

Basically, the purpose of this PERT chart is to merely illustrate, or demonstrate, the key features of PERT charts, with respect to their significant importance within the project management industry.

Moreover, the project start, and project complete, milestone elements are shown, as these two milestones are fundamental rudiments of utilising PERT. In addition, in PERT, the emphasis is on the milestones, rather than the interconnections (or links between the components), or indeed actual tasks.



**Figure 2.3.2.1. PERT Chart**

# CPM (Critical Path Method)

## Analytical Overview

CPM is an acronym for Critical Path Method, and the critical path method is merely a project planning approach that endeavours to find the critical path within a project.

Moreover, put simply, the critical path is merely the path with the most dependencies; where dependencies are a term for tasks that are dependent upon other tasks. An example would include: before you can dry the dishes you must wash them. Basically, in project management style, drying the dishes is a task that is dependant upon the task of washing the dishes.

Consequently, this means that the task of washing the dishes must be completed before the task of drying them can commence. In other words, as project management defines it, these tasks must be completed on a start to finish basis.

Conversely, if the dishes have not been washed, then they are not wet; subsequently they do not need to be dried. This example, although trivial, illustrates that in a project certain tasks are dependent upon others (or have a differential precedence relationship); subsequently this variant dependency can result in delays if the predecessor task of a dependent successor task is somehow out of alignment with the project plan, or in other words simply delayed.

Moreover, if the successor task of a predecessor task does not require the predecessor task to have completed before it can commence, then both tasks can be undertaken simultaneously, or as project management defines it, on a start-to-start basis. Therefore as a result, increasing productivity and efficiency, with respect to the project as a whole, as two or more tasks can be undertaken concurrently.

Furthermore, in a real-time project delays tend to increase costs. Therefore, the purpose of the Critical Path Method is to identify the critical paths within a project (or alternatively, the most likely trouble routes in terms of delay) in order to manage the project most efficiently, effectively and economically. Hence, ensuring the project can be completed both successfully and cost-effectively within the required time constraints previously depicted by the client.

Moreover, in its historical context, the Critical Path Method was initially designed and developed by Du Pont and Sperry in the late 1950s, and in addition, the emphasis of its development was on the trade-off between the economics of a project and the amount of time it takes to complete. For example, increasing costs will likely reduce the amount of working time on an activity, and subsequently reduce the overall project lifetime. As a result, efficiency is increased, but only at the expense of spending more money.

Consequently, the Critical Path Method endeavours to focus on identifying the critical paths (the ones with the most dependencies) through the project in order to maximise efficiency, with respect to the trade-off between cost and time.

Basically, to determine if a path is critical, one must firstly determine the critical activities within the project. In addition, activities are considered critical if a delay in an activity is deemed likely to lead to a delay in the corresponding project.

Further, in terms of construction, the Critical Path Method is similar in nature to the Program Evaluation and Review Technique in the sense that both approaches utilise network diagrams as a means of conveying project information. However, the Critical Path Method is often the preferred method for conveying project information because it utilises an activity labelled approach as opposed to an event labelled one.

Furthermore, in an activity labelled network diagram it is the interconnections between the component parts of the diagram that are of significant importance. Basically, arrows are commonly used to link tasks, and in addition, these arrows (links) are themselves representative of an individual task. For example, as arrows represent tasks (or activities), then subsequently this means CPM charts are quite intuitive to follow, and thus consequently easy to comprehend.

In addition, PERT and CPM may have similar methods of construction, but their project management methodologies are distinctively different.

For example, in summary, one of the differences between the Critical Path Method and PERT is that the Critical Path Method assumes the time durations for the individual component tasks are known; whereas PERT takes the time tasks take to complete to be random with sporadic known estimates. Therefore, in other words, PERT may be more flexible as it provides the ability to experiment with different environmental parameters, thus subsequently determining more efficient and effective project management practices; however conversely, the Critical Path Method provides realistic project plans that depict project tasks in real-time. Obviously, the disadvantage of CPM is that it is not quite as flexible as PERT.

Additionally, PERT is primarily a milestone-oriented project management method, where milestones merely represent the completion of a task. Whereas conversely, the Critical Path Method is an activity oriented approach. Thus subsequently, CPM provides a task representative approach to real-time project information conveyance.

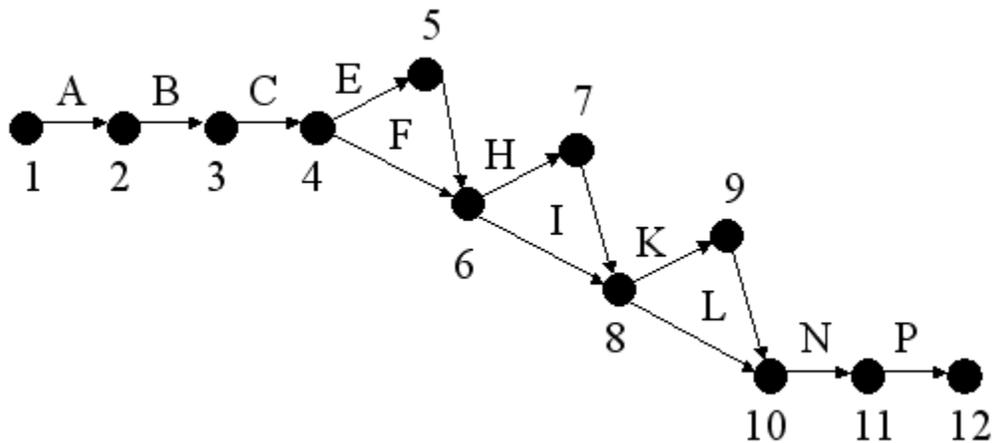
Moreover, CPM is quite an advantageous project management methodology, as not only does it convey real-time project management information; but it is relatively easy to construct and comprehend as well; however its comprehension could be skewed if the project plan that corresponds to the CPM chart is lost. Further, the distinct disadvantage with CPM is that project management diagrams can rapidly grow in size, and in addition, subsequently the larger the diagram; the greater the time required for analysis, and indeed consequently diagrammatical management. Also, this

disadvantage is also shared with both PERT and Gantt, as they too do not scale well when depicting diagrams.

More specifically, put simply, typically all three traditional project-planning methods tend to consume vast amounts of space, whether it is on a computer screen or indeed on paper, when compared to a project plan that is representative of an act of literacy (or in other words, a word-oriented project plan).

### A CPM Chart

A CPM chart is illustrated in the figure below, and it corresponds to the simplified project plan located in Appendix 1 of this report. Moreover, in summary, the arrows (links) represent activities, and in addition, their juxtaposed letters correspond to the associated activity in the project plan.



## Summary – Comparing Gantt, PERT and CPM

In summary, Gantt charts are simple to comprehend and easy to construct, primarily due to their graphical, aesthetically pleasing composition. Thus consequently, as a result of their intuitive nature they subsequently significantly improve project plan readability, for both workers as well as the project manager.

However, conversely, Gantt charts offer little information relating to the project, thus therefore, Gantt charts are an inherently inflexible project planning approach. Subsequently, in addition, this inflexibility consequently, and quite significantly, reduces the effectiveness of using Gantt charts to control large complex projects.

Thus consequently as a result, Gantt charts are used to manage small to medium-sized projects, and in addition, they commonly tend to be used to allow all parties involved in a project (workers as well as the project manager) to be assured of project progression, and also be visibly aware what stage the project under scrutiny is at.

In contrast, the PERT project planning methodology is inherently flexible. For example, PERT provides the ability to determine the functionality of a project in different situations, and as such, can subsequently provide an estimation of the maximum, minimum and most probable time scale for activities, or indeed the project as a whole. Consequently, its powerful flexible inherent nature provides project managers with an effective ability towards maintaining project management practice efficiently, effectively and economically. Subsequently, PERT's flexible nature ensures an idealistic suitability for controlling large complex projects effectively.

However, conversely, due to PERT's inherent complex nature, the risk of project plan misinterpretation is increased, and thus the requirement necessary to understand PERT-oriented projects effectively is for well-trained, knowledgeable project managers. Moreover, as knowledgeable personnel are often well paid, then the cost of flexibility, and comprehension, is subsequently much higher than the graphically oriented, intuitive Gantt project planning approach. Therefore, on the face of it, PERT is instantaneously less economically viable than the intuitively simplistic Gantt project planning methodology.

Furthermore, however consequently, the cost difference is likely to affect performance, in terms of efficiency and effectiveness. Therefore, subsequently it may be worthwhile investing in a PERT-oriented project planning approach, in order to achieve the associated performance benefits.

Unlike PERT, where its primary benefit is the estimation of the maximum, minimum and most probable activity time scales, the Critical Path Method achieves a visually realistic aspiring project plan that is based upon authentic data parameters. Therefore subsequently, due to this visually realistic project planning approach, project managers can clearly ascertain real-time project information. Thus, as a result, consequently formulate decisions based upon what is currently happening in the project, rather than

what might happen in the case of PERT. In other words, with CPM, there is this sense of realism, rather than the nature of pre-empting like PERT.

Moreover, in similarity with PERT, CPM uses a network-style diagram to convey project information. However, in contrast, the difference is that PERT uses an event labelled approach and CPM uses an activity labelled approach. Further, the advantage of an event labelled approach is that milestones are labelled on the diagram, and as such, the diagram thus provides facilitation towards the monitoring of project progression. Whereas the activity labelled diagram is merely representative of authentic project tasks, which subsequently convey real-time project task information.

Consequently, this real-time project information conveyance provides project managers with the ability to view the relationships (or alternatively dependencies) between interrelated tasks.

Furthermore, as a result of understanding task relationships, project managers can subsequently determine the criticality associated with various activities; and thus consequently, the ultimate effect is an ensuring facilitation of maintaining project management practice as efficiently, effectively and economically as possible.

## **Contemporary Project Planning Techniques**

### **Project Management Methodology Aggregation**

Since the 1950's, when the traditional project planning techniques were born, project management has subsequently dynamically adapted itself, and consequently, has evolved to manage the ever-increasingly demanding, complex projects of the 21<sup>st</sup> century. In addition, this adaptation thus therefore insinuates that modern approaches to project management are somehow derivative of those approaches previously developed and implemented in the past.

Moreover, basically the key features of all modern project management approaches are derived from the three traditional project management methodologies of Gantt, PERT and CPM. Subsequently, nowadays it is common to aggregate project management techniques that reside as part of different, diverse project management methodologies into a single amassed approach to project management. Essentially, this type of approach to project management is known as a hybrid approach.

Further, generally the features that are extracted from traditional project management methodologies are those that have an advantageous nature, in some way or another, towards devising efficient, effective, and economically viable project management practices. Fundamentally, in summary, the effect of aggregating project management methodologies increases, if not in whole but in part, the effectiveness of project management, in terms of efficiency and cost.

Furthermore, the hypothesis at the basis of aggregating project management techniques is similar, in principal, to the old adage: *“two heads are better than one!”* Basically, the theory is thus that by combining multiple diverse project management techniques, the resultant situation is an improvement in performance gain.

Additionally, with respect to the Gantt project planning approach, it tends to be its graphically oriented modus operandi that is desired by most, probably due to its subsequent intuitively apparent nature in which it conveys project information.

Basically, in other words, as Gantt charts are easy to construct and understand, then subsequently there is a desire to incorporate Gantt charts as part of hybrid project plans, in order to consequently maximise the facilitation of project plan comprehension among all individuals participating in the project under development.

Alternatively, with respect to the Program Evaluation and Review Technique, it is the inherent and historically proven effective use of milestones that subsequently encourages the incorporation of milestone-like tasks as part of a hybrid (aggregated) project plan.

Moreover, essentially, the inclusion of milestones in a project plan facilitates ease of project management and monitoring regarding project progression, and indeed specifically focuses on ensuring efficient time management.

Therefore consequently, the inclusion of milestones as part of a hybrid project plan can greatly assist the project manager in monitoring, and managing, project progression, and in addition, in determining activities that are taking too long. Consequently, it is due to these advantageous characteristics of milestones, that subsequently is the reasoning for milestone-like tasks being favourable project management utilities in a project manager’s toolbox.

Additionally, with regard to hybrid project management techniques, the Critical Path Method has useful characteristics that can subsequently be exploited in an attempt to facilitate an efficient, effective and economic project planning methodology. Further, in essence, it is the Critical Path Method’s task-oriented representation, and its usage of dependencies (links) that are of significant importance in effectively conveying project information, and in addition, subsequently developing hybrid, or alternatively cumulatively customised, approaches to project planning.

Furthermore, essentially, the Critical Path Method’s task-oriented project planning approach provides facilitation towards understanding the tasks (activities) associated with the project under development. Subsequently, in other words, the task-oriented approach, which is part of the Critical Path Method, provides project managers with the knowledge required to understand the various tasks that are part of the project, in order to consequently successfully complete the project under management.

Consequently, due to this knowledge and understanding of project tasks, project efficiency and effectiveness is increased, specifically in terms of productivity and cost. Additionally, as a result, the Critical Path Method's task-oriented approach is an idealistic project planning technique; thus subsequently it is due to this reason that a task-oriented project planning approach is often adopted and incorporated as part of hybrid project plans.

Moreover, the Critical Path Method also utilises dependencies (or links) to provide an assuring facilitation towards determining the relationships, or interconnections, between the tasks associated with the project under management. Subsequently, the consequence of this dependency utilisation provides a determination of project task order, and in addition, an understanding of task interrelationships.

Consequently, incorporating the Critical Path Method's usage of dependencies into a hybrid project plan provides additional flexibility to the project manager, in the sense that the project manager can subsequently alter the project plan, in terms of task dependencies. As a result, altering what tasks are dependent on has the potential towards increasing project efficiency and effectiveness, with respect to productivity.

In summary, including the Critical Path Method's task-oriented representation, and its usage of dependencies (links), together collectively in a hybrid project plan, thus consequently provides facilitation towards understanding the tasks associated with the project under management, and in addition, ensures acknowledgement regarding the order in which the project's tasks should be undertaken. Consequently, as a result, the primary characteristics of the Critical Path Method provide a contribution towards an efficient, effective, and economic approach to project planning.

To conclude, combining Gantt's intuitive graphically oriented approach to project planning, the Program Evaluation and Review Technique's milestone oriented approach, and the Critical Path Method's task, and dependency, oriented approach, subsequently provides a coherent facilitation towards developing an efficient, effective and an economically viable customised project planning methodology, in terms of productivity and monetary related matters.

## **Computer Mediated Project Management**

With the advent of computer systems, and their associated technologies, there has been a change of approach relative to the way in which whole industries communicate business. Essentially, computer technologies efficiently, effectively and economically increase the productivity, and the effectiveness, of business practice, without a shadow of a doubt.

Moreover, with regard to the project management industry, computer technologies have had a tremendous affect, and indeed continue to have an aspiring influence in relation to the way in which project management is conducted, with specific respect being

awarded to the modus operandi of the computer, and indeed its application towards project management.

More specifically, computerised approaches to project management tend to facilitate ease of understanding to the computer user, with regard to project plan development.

Essentially, computerised project management facilitates the automation of project related tasks. In other words, subsequently, when the computer user clicks a button on a mouse, for example, the computer thus initiates its operability state and automatically undertakes some project related task. Such an example might include: calculating the length of time the project as a whole will take with respect to the user, or project manager, entering task (activity) durations.

Additionally, it is often the case that computerised project management is representative of an aggregated (hybrid) project planning methodology.

Consequently, moreover, computer-mediated task automation, in combination with the inherent nature of project management methodology aggregation, which is often present in project management computer software, subsequently tends to reduce the level of knowledge required to understand the complexities associated with the individual project planning techniques that are aggregated as part of a single unified solution to project management.

In essence, the advantage is that computer users, or project managers, do not need to understand the inherent complex nature associated with a particular project management methodology, in order to utilise that technique in an aggregated approach to managing a project. Basically, computer users can simply, yet effectively, utilise a hybrid project management approach, and in addition, they can do it merely using a single user interface. Thus consequently, project management flexibility is achieved efficiently, effectively and economically.

Furthermore, an aggregated (hybrid), and computer-mediated, approach to project management and/or project planning generally increases the effectiveness of the project management solution, as computers can undertake mundane tasks timelessly, without losing interest or getting tired, unlike fickle human beings.

As a result, in consequence, computerised project management approaches tend to provide advantageous characteristics to project management, for example, the ability to intuitively utilise the best parts of numerous project management techniques. Subsequently, computerisation thus therefore contributes to an efficient and effective project management practice.

Moreover, as computerised project management tends to provide facilitation towards an aggregated project management approach, then subsequently there are inherently abundant disadvantages associated with the computer-mediated methodology. In essence, project management computer software tends to blur the demarcation

between the various project management approaches, which are collectively combined into a single aggregated project management methodology.

Therefore consequently, the result provides project managers with a less comprehensible understanding of their project plan, and indeed subsequently condenses their understanding of project management processes in general, with specific regard to the differences between the many diverse project management methodologies in existence as part of their self-devised project plan.

In summary, project management computer software tends to bamboozle the distinctiveness between the many methodologies, or techniques, that exist for planning projects. Subsequently, in consequence, the resultant state of affairs has the potential towards reducing a project manager's understanding of the project planning process, with respect to the diverse project planning methodologies in focus.