

PROJECT MANAGEMENT: A SYSTEM APPROACH TO PLANNING, IMPLEMENTATION, MONITORING AND EVALUATION

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Abstract

Project management has evolved from a management philosophy restricted to a few functional areas; many companies/organizations are now regarding project management as being mandatory for the survival of the firm. This paper aims at providing an insight academically to the system approach involved in project management, which are planning, implementation, monitoring and evaluation. The project management processes are key framework for successful completion of any project. Project planning marks the beginning of the project and it involves identifying and scheduling the work packages or activities necessary to perform the project; preparing estimates of duration, cost, and resources; developing plans to ensure quality, manage risks, and control scope; establishing communications and reporting strategies; acquiring resources, both people and contracts; and integrating these elements into a comprehensive planning document. This can be done using project planning tools like Work Break down structure, Gantt chart, Critical Path analysis and Project Evaluation Review Techniques. Project implementation involves bringing the various plans to reality, in other words plan is put into action. The plan is implemented upon to achieve the project objective which is done by making sure that appropriate quality standards and operational definitions are used. Project monitoring and evaluation on the other hand is carried out alongside project implementation in order to measure the project activity, monitor project variables (cost, scope, effort) against management plan and baseline, address issues and risk properly. And lastly, closure marks the end of the project. These project management processes discussed in this work, are set of discrete elements which have interrelated activities and actions performed together systematically to achieve a specified result, product and services. The case study cited in this paper illustrated importance of the various techniques in organizing a wedding.

Keywords: Project management, planning, implementation, monitoring, evaluation.

1.0 Introduction

It has been perceived in the course of time that project management as an effective apparatus to handle novel or complex exercises (Stuti-Garg, 2014). Project management was first seen as an individual subject within the area of economic science in the 1950's. Other centuries ago, projects were finished using informal techniques and tools. Project management was earlier confined to U.S. Department of defense contractors and construction companies. Today, the concept behind project management is being applied in diverse industries and organizations such

as defense, construction, pharmaceuticals, chemicals, banking, hospitals, accounting, local government, state government and others (Kerzner, 2009). Project management is now regarded as a very important tool used in different companies and organizations whether small or large. The development of project management has always been parallel of general trends in worldwide economics. The 1990's were all about globalization; the 2000's were about velocity and this present decade the world is about facing economic recession (Passenheim, 2009). A key aspect of delivering profitable new product development project is, ensuring that project deliverables are produced within the available time and budget, while ensuring that they are of adequate quality (Wynn and Clarkson, 2009). These endeavors would call for more and quicker choice making strategies than conceivable in an ordinary operation and settling on the right decisions will be discriminating to achievement of organization.

Project is a set of well-defined resources dedicated to achieving specific results in a defined period of time. According to PMI (2000) & Nokes (2007), the term project is a temporary endeavor designed to produce a unique product, service or result with a defined beginning and end (usually time-constrained, and often constrained by funding or deliverables) undertaken to meet unique goals and objectives, typically to bring about beneficial change or added value. A project has a clear time frame (start and end), and a clear strategy of how to use resources to produce results. Project is said to be a temporary rather than permanent social system or work system that are constituted by teams within or across organizations to accomplish particular tasks under time constraints (Manning, 2008). The temporary nature of projects stands in contrast with business as usual or operations, which are repetitive, permanent, or semi-permanent functional activities to produce products or services (Dinsmore, 2005). Projects are designed and implemented to address developmental needs or problems (Woodhill, 2000).

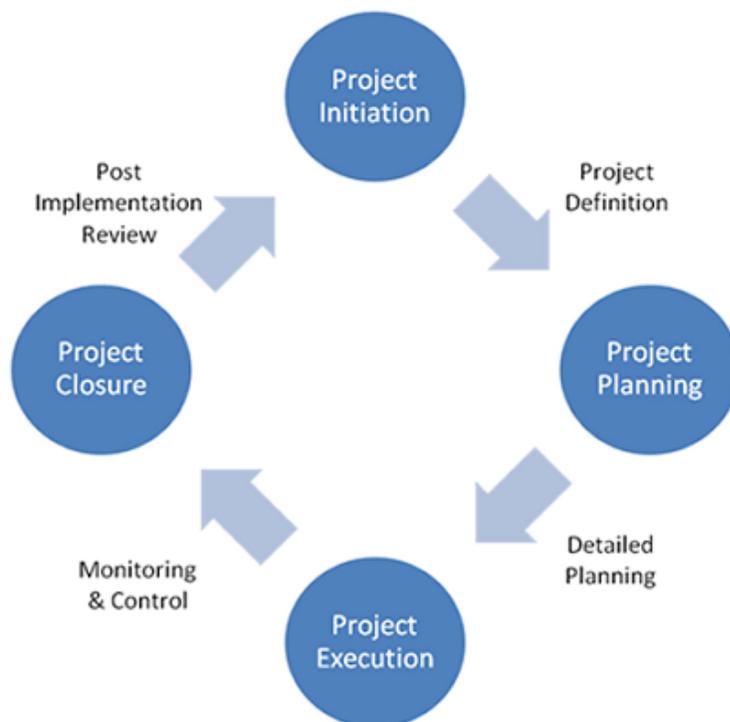


Fig 1: Project Cycle. (Source: www.wikipedia.com)

Management on the other hand is the function that coordinates the efforts of people to accomplish goals and objectives by using available resources efficiently and effectively. These resources being financial resources, technological resources, natural resources, human resources and lots more.

Project management is the discipline of carefully projecting or planning, organizing, motivating and controlling resources to achieve specific goals and meet specific success criteria. It is the application of knowledge, skills, tools and techniques to project activities to meet project requirements (PMI, 2000). The primary challenge of project management is to achieve all of the project goals (Ireland, 2006) and objectives while honoring the preconceived constraints (Phillips, 2003); these information are usually described in a user or project manual, which is created at the beginning of the development. Project management utilizes the systems approach to management by having functional personnel assigned to a specific project (Kerzner, 2009).



Fig 2: Overview of project management (Kerzner, 2009)

Managing a project typically includes:

- i. identifying the requirements
- ii. addressing the various needs, concerns, and expectations of the stakeholders as the project is planned and carried out
- iii. balancing the constraints which includes:
 - a. scope
 - b. quality
 - c. schedule
 - d. budget
 - e. resources, and
 - f. risks

The relationship amongst these constraints listed above is such that if any one factor changes at least one other factor is likely to be affected. For example, if the schedule is shortened, the budget needs to be increased or the scope or quality needs to be reduced (PMI, 2008). Project

management is accomplished through the appropriate application and integration to the 42 logically grouped project management process comprising the five process groups (Filicetti, 2000). These five process groups are:

- i. initiation
- ii. planning
- iii. execution/ Implementation
- iv. monitoring and Evaluation, and
- v. closing

Initiation process involves defining the scope, purpose, objectives, resources, deliverables, timescales, schedules and structure of the project. **Planning** process involves identifying, scheduling the work packages or activities necessary to perform the project, constructing estimates of duration, cost, and resources, developing plans to ensure quality, manage risks, and control scope, establishing communications and reporting strategies, acquiring resources, integrating these elements into a comprehensive planning document. **Execution/ Implementation** on the other hand involves performing work and producing deliverables bearing in mind the constraints such as time, cost, and performance which will drive and limit the project life cycle. **Monitoring and Control** process is done to make sure everything goes according to plan. In other words, it identifies discrepancies, handles change management, and provides feedback to update and progressively elaborate the plan. The **closing** out process marks the end and completion of the project. At this point all the required objectives. Although initiation starts the project and closeout ends it, the other three processes form a loop; planning leads to execution, which requires monitoring and control, which feeds back into additional planning. A successful project management can be defined as having been completed within time, cost, at the desired performance, have utilized assigned resources efficiently and effectively and is accepted by the customer.

Project management is designed to make better use of existing resources by getting work to flow horizontally and vertically anywhere it is been used (Kerzner, 2009). Nowadays, almost more than ever, the need for various projects to be carried out with proper technique and tool needs to be put in place to return the world to its former speed. The importance of continuous learning and development of project management in the academic sector cannot be over emphasized, hence the reason for the paper. This paper aims at giving an insight academically to the planning, implementation, monitoring and evaluation of projects by providing a case study for better understanding.

2.0 Project Planning

Project planning is the first phase of project management and the most difficult. It involves the definition of the work requirements, work quantity and quality, necessary requirements, scheduling of activities, and evaluation of various risks involved (Kerzner, 2009) using effective planning techniques. It is inherently uncertain as it must be done before the project is started. Therefore the duration of the tasks is often estimated through a weighted average of optimistic, normal, and pessimistic cases (Nathan & Jones, 2003). It begins with understanding of the assumptions. The assumptions are the conditions that can affect the success of the project.

Project planning is used to organize different areas of a project, including project plans, workloads and the management of teams and individuals. The logical dependencies between

tasks are defined using an activity network diagram that enables identification of the critical path. Before the project planning stage, the project scope/objectives are defined and the appropriate methods for completing the project are determined. Project planning relates to the use of schedules such as Gantt Charts, Work Breakdown Structure, Critical Path Analysis, Project Evaluation and Review Technique, to plan and subsequently report progress within the project environment (Kerzner, 2003). The inputs of the project planning phase include the project charter and the concept proposal. The outputs of the project planning phase include the project requirements, the project schedule, and the project management plan (PMI, 2010).

2.1 Processes of Project Planning

Some planning processes are stated below according to PMI, 2008 include;

- i. Requirements collection: This process involves defining and documenting stakeholders needs to meet the objectives.
- ii. Scope definition: This is the process of developing a detailed description of project and product.
- iii. Work Breakdown Structure creation: It involves subdividing project deliverables and project work into smaller, more manageable components.
- iv. Definition of Activities and their sequences: It involves identifying the specific actions to be performed to produce the project deliverables and documenting the relationships between each project activity.
- v. Activity resources and duration estimation: This involves the estimation of the type and quantities of material, people, equipment, or supplies required to perform each activity and the time needed to complete the activities with estimated resources.
- vi. Development of schedule: This is the process of analyzing activity sequences, durations, resource requirements and schedule constraints to create the project schedule.
- vii. Costs Estimation: This involves developing an approximation of the monetary resources needed to complete project activities.
- viii. Budget Determination: This is the process of aggregating the estimated costs of individual activities or work packages to establish an authorized cost baseline.
- ix. Plan Quality: This is the process of identifying requirements and standards for the project and product, and documenting how the project will demonstrate compliance.
- x. Plan Communication: This is the process of determining project stakeholder information needs and defining a communication approach.
- xi. Identification of risks and risk management: this involves determination of the possible risks that may affect the project and its management.
- xii. Quantitative Risk Analysis: This is the process of numerically analyzing the effect of identified risks on overall project objectives.
- xiii. Plan Risk Responses: This process involves the development of options and actions to enhance opportunities and to reduce threats on project objectives.
- xiv. Plan Procurement: This is the process of documenting project purchasing decisions and specifying the approach.

2.2 Project Planning Schedules / Tools

Some of the tools used in planning a project according to PMI, 2004 include:

- i. Work Breakdown Structure

- ii. Gantt Chart
- iii. Critical Path Analysis (CPA)
- iv. Project Evaluation and Review Techniques (PERT)

Work Breakdown Structure (WBS)

A work breakdown structure is a deliverable-oriented decomposition of a project into smaller components. A work breakdown structure is a key project deliverable that organizes the team's work into manageable sections. It is also defined as deliverable oriented hierarchical decomposition of the work to be executed by the project team. Work breakdown structure element may be a product, data, service, or any combination thereof. It provides the necessary framework for detailed cost estimating and control along with providing guidance for schedule development and control (Gregory, 1962). It is a product-oriented family tree subdivision of the hardware, services, and data required to produce the end product. The WBS is structured in accordance with the way the work will be performed and reflects the way in which project costs and data will be summarized and eventually reported. The work breakdown structure acts as a vehicle for breaking the work down into smaller elements, thus providing greater probability that every major and minor activity will be accounted for (Kerzner, 2009). It can be represented in a **Chart Format**.

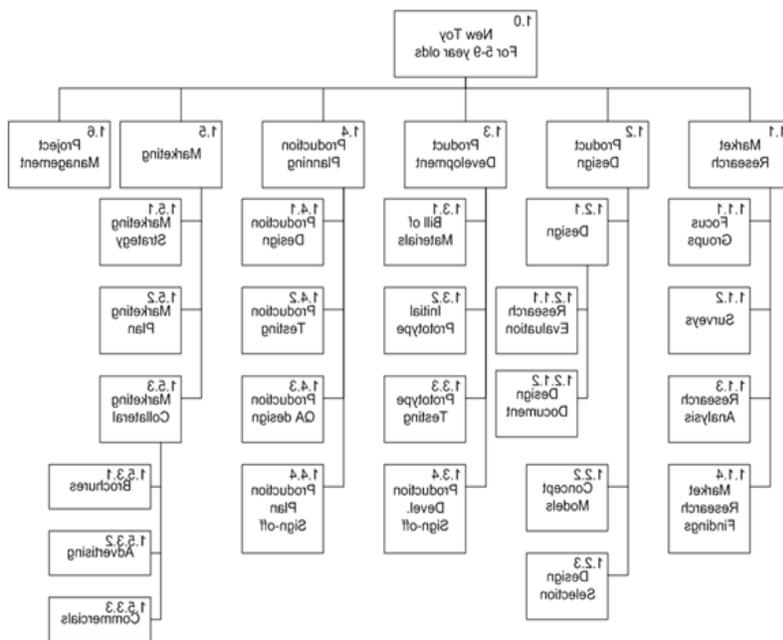


Fig 3: WBS for a new toy in a Chart Format (Gregory, 1962)

Importance of Work Breakdown Structure

- i. Can be used to allocate and delegate responsibility to help accomplish different tasks or activities.
- ii. Can help sequence and schedule the of different events to improve effectiveness of how time is allocated.
- iii. Improves resource planning and the efficiency of how resources are consumed.

- iv. Can be used as a basis of financial “exception reporting”.
- v. Can be used for risk management.

Gantt chart

This was devised by Henry Gantt in 1917. Gantt chart is a horizontal bar chart used for project scheduling. Gantt charts illustrate the start and finish dates of the terminal elements and summary elements of a project. It provides a graphical illustration of a schedule that helps plan, coordinate, and track specific tasks in a project. Terminal elements and summary elements comprise the work breakdown structure of the project. Modern Gantt charts also show the dependency (i.e., precedence network) relationships between activities (Wilson, 2003). The Gantt chart is constructed with a horizontal axis representing the total lifespan of the project broken down into increments (days, weeks, months) and the vertical axis representing the tasks that make up the project. The horizontal bar of varying lengths represents the sequence, timing, and time span of each task. It is a time-scaled graphic that represent each activities with bar that reflects the duration, start and finish time. It uses the logic developed in the Network Diagram, considers the length of time it takes to execute individual activities, factors in resource availability, and places everything into calendar time (Heerkens, 2002). It is easy to read and provides sufficient information for project team members to plan activities within a short time frame (Kerzner, 2009). Although, Gantt chart gives a clear illustration of project status, it cannot indicate when a task is falling behind schedule.

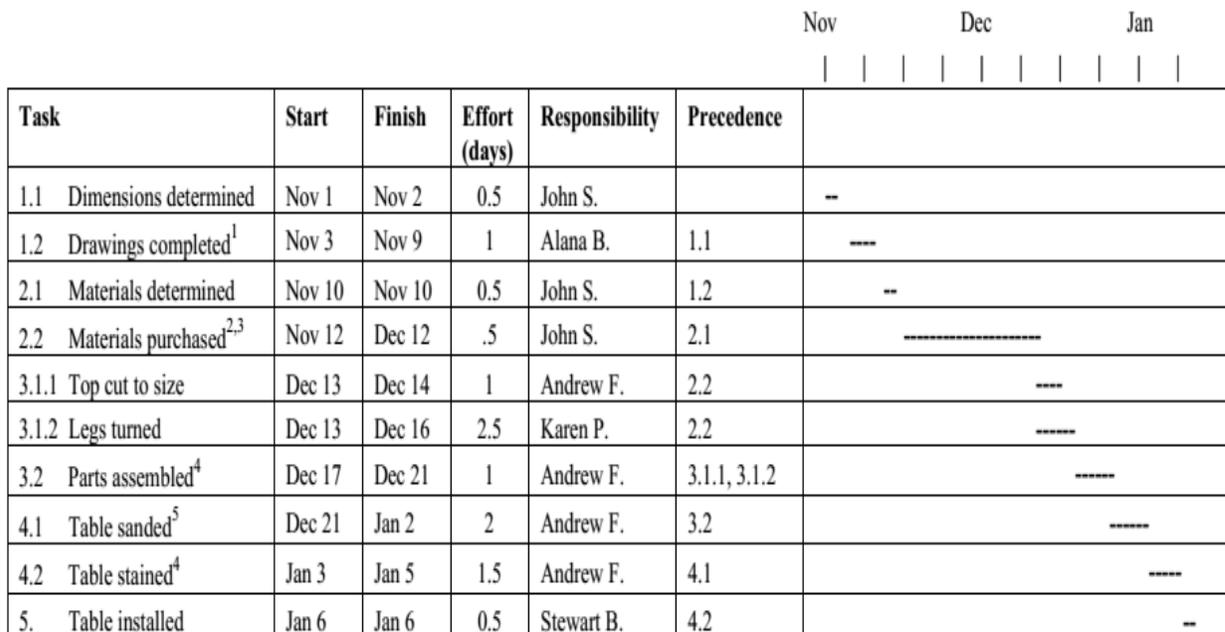


Fig 4: Gantt chart (Wilson, 2003)

Uses of Gantt chart

- i. Can be used to plan time scale for a project.
- ii. Can be used to estimate resources required.
- iii. Graphical illustration of schedule of tasks to complete.

- iv. Help to plan, coordinate, and tasks for a project.
- v. Good for small project when the numbers of tasks or activities are small and not complex.

2.2.3 Critical Path Analysis

Also referred to as network analysis, can display more logically the sequence and timing of each activity; they communicate independency and a more effective time management tool for large and complex projects. It was developed by Du Pont to solve project scheduling problems with the emphasis on the trade-off between the cost of the project and its overall completion time.

Uses of Critical Path analysis

- i. Good visual communication and planning tool for effective time management.
- ii. Displays clearly interdependent relationships that exist between the different activities or tasks to be completed.
- iii. Arranges tasks or activities into an optimum sequence of events allowing a project to be completed in the most efficient time possible.
- iv. Elapsed time to complete can be calculated.
- v. Highlights those activities which are “critical activities”.
- vi. Enables more effective resource planning; resources can be diverted away from “ non-critical” to “Critical activities”.

Process of Critical Path Analysis

- i. Break down project into a logical sequence of activities to be completed.
- ii. Estimates the time duration of each activity.
- iii. Arranges activities in the most efficient sequence of events and estimate the elapsed time of the project.

Advantages of Critical Path Analysis

- i. Identifies interrelationships between different tasks or activities.
- ii. Resources can be planned and allocated from using it.
- iii. Good communication and planning tool for time management.

Disadvantages of Critical Path Analysis

- i. Assumes a tradeoff between time and money, but most staff cost could be a fixed and not variable cost.
- ii. The complexity of the diagram will increase as more activities are included.
- iii. Key uncertainties often exist when estimating the duration for activities, therefore can be a poor prediction for elapsed time.

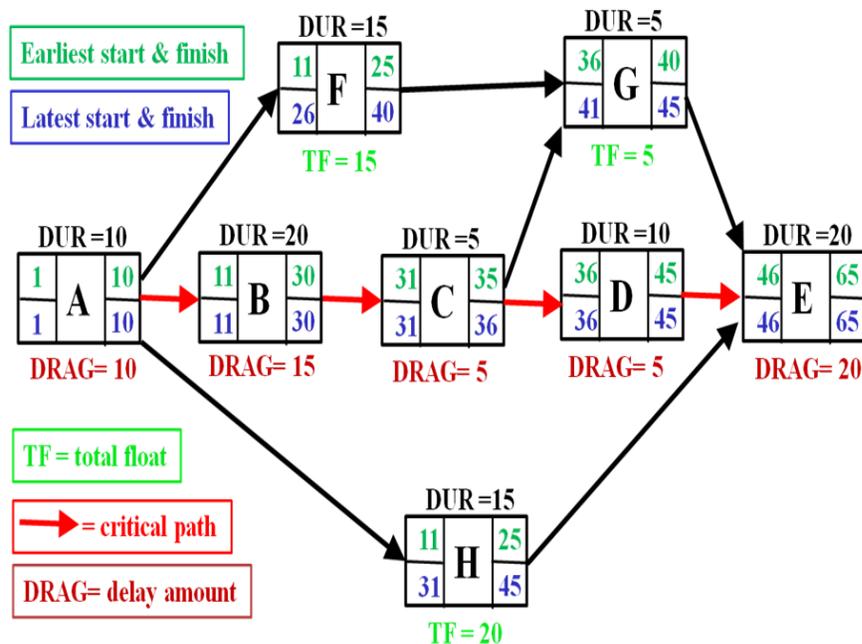


Fig 5: Critical path Analysis Schedule (Source: www.wikipedia.com)

Project Evaluation and Review Techniques (PERT)

This technique gives better time estimation for the project, by accounting for the uncertainty when predicting task duration. Project Evaluation and Review Techniques is a statistical tool used in project management which was designed to analyze and represent the task involved in completing a given project. It was developed in the 1950's by United States Navy for planning and control of the Polaris missile program, with the emphasis on completing the program in the shortest time possible (Stauber et al., 1959). The technique takes recognition of three factors that influence successful achievement of research and development project objectives: time, resources and technical performance specifications. Time is employed as a variable that reflects planned resource applications and performance specifications.

Advantages of Project Evaluation and Review Technique

- Its chart explicitly defines and makes visible dependencies (precedence relationships) between the work breakdown structure elements.
- It facilitates identification of the critical path and makes it visible.
- It also facilitates identification of early start, late start, and slack for each activity.
- It provides for potentially reduced project duration due to better understanding of dependencies leading to improved overlapping of activities and tasks where feasible.
- The large amount of project data can be organized & presented in diagram for use in decision making.
- It can provide a probability of completing before a given time.

Disadvantage of Project Evaluation and Review Technique

- i) There can be potentially hundreds or thousands of activities and individual dependency relationships.
- ii) It is not easily scalable for smaller projects.
- iii) The network charts tend to be large and unwieldy requiring several pages to print and requiring specially sized paper.
- iv) The lack of a timeframe on most Project Evaluation and Review Technique makes it harder to show status although colours can help (e.g., specific colour for completed nodes).

Similarities between Critical Path Analysis and Project Evaluation and Review Technique

- They are both quantitative techniques of network analysis
- They are both used as decision making tools
- They both involve drawing and analysis of network diagram on various scores

Differences between Critical Path Analysis and Project Evaluation and Review Technique

S/N	Critical Path Analysis	Project Evaluation and Review Technique
1	It uses deterministic concept	It uses probabilistic model concept
2	Results are calculated on the basis of activities	Results are calculated on the basis of events
3	The duration of the activity maybe estimated with a fair degree of accuracy	The estimate of time for activities are not so accurate and definite

3.0 Project Implementation/Execution

This is the next stage after project planning. It is the phase where visions and plans become reality. It involves negotiating, directing and managing the task at hand (Kerzner, 2009). It is performed to complete the task defined in the project management plan to satisfy the project specifications. It also involves coordinating people and resources, as well as integrating and performing the activities of the project in accordance with the project management plan. During project implementation also known as execution; results may require planning updates and re-baselining. This can include changes to expected activity durations, changes in resource productivity and availability, and unanticipated risks. Such variances may affect the project management plan or project documents and may require detailed analysis and development of appropriate project management responses. The results of the analysis can trigger change requests that, if approved, may modify the project management plan or other project documents and possibly require establishing new baselines. A large portion of the project's budget will be expended in this stage.

3.1 Objectives of Project Implementation

The objectives of the implementation phase can be summarized according to Moriarty et al. (2007) as follows:

- i) Putting the action plan into operation.
- ii) Achieving tangible change and improvements.
- iii) Ensuring that new infrastructure, new institutions and new resources are sustainable in every aspect.
- iv) Ensuring that any unforeseen conflicts that might arise during this stage are resolved.
- v) Ensuring transparency with regard to finances.
- vi) Ensuring that potential benefits are not captured by elites at the expenses of poorer social groups.

The basic requirement for starting the implementation process is to have the work plan ready and understood by all the workers involved. Technical and non-technical requirements have to be clearly defined and the financial, technical and institutional frameworks of the specific project have to be prepared considering the local conditions. The working team should identify their strengths and weaknesses (internal forces), opportunities and threats (external forces). The strengths and opportunities are positive forces that should be exploited to efficiently implement a project. The weaknesses and threats are hindrances that can hamper project implementation. The implementers should ensure that they devise means of overcoming them. Another basic requirement is that the financial, material and human resources are fully available for the implementation. The implementation process includes the following project processes according to PMI (2008):

- i) Direct and manage project Execution: This is the process of performing the work in the project management plan to achieve the project's objectives.
- ii) Perform Quality Assurance: This is the process of auditing the quality requirements and the results from control measurements to ensure appropriate quality standards and operational definitions are used.
- iii) Acquire Project Team: this is the process of confirming human resource availability and obtaining the team necessary to complete project assignments.
- iv) Develop Project Team: This is the process of improving the competencies, team interaction and the overall team environment to enhance project performance.
- v) Manage Project Team: This is the process of tracking team member performance, providing feedback, resolving issues, and managing changes to optimize project performance.
- vi) Distribute Information: This is the process of making relevant information available to project stake holders as planned.
- vii) Manage Stakeholder Expectation: This is the process of communicating and working with stakeholders to meet their needs and addressing issues as they occur.
- viii) Conduct Procurement: This is the process of obtaining seller responses, selecting a seller and awarding a contract.

4.0 Project Monitoring and Evaluation

Monitoring is the systematic and routine collection of information from projects and programs in order to: improve practices and activities, be accountable in terms of resources, take informed

decisions and promote empowerment of beneficiaries. It is a periodically recurring task already beginning in the planning stage of a project or program. It allows results, processes and experiences to be documented and used as a basis to steer decision-making and learning processes. Monitoring is checking progress against plans. The data acquired through monitoring is used for evaluation (Albert, 2004).

Evaluation is on the other hand the assessing systematically and objectively as possible, a completed program of an on ongoing one. It appraises data and information that inform strategic decisions, thus improving the project or program in future (Lock, 2007). Evaluation helps draw conclusion on the project's relevance, effectiveness, efficiency, impact and sustainability (Woodhill, 2000). Information gathered in relation to these aspects provides the basis for the evaluative analysis (Stevens, 2002).

Monitoring and evaluation (M&E) is therefore a process that helps improving performance and achieving results. Its goal is to improve current and future management of outputs, outcomes and impact. It involves tracking project process, comparing outcome to predicted outcome, analyzing variances and impacts, and making necessary adjustments/changes (Kerzner, 2009). It is mainly used to assess the performance of projects, institutions and programs set up by governments, International Organizations and NGOs. It establishes links between the past, present and future actions. These processes can be managed by the donors financing the assessed activities, by an independent branch of the implementing organization, by the project managers or implementing team themselves or by a private company (Marsh, 1975). Many international organizations such as the United Nations, the World Bank group and the Organization of American States have been utilizing this process for many years. The process is also growing in popularity in the developing countries where the governments have created their own national monitoring and evaluation systems to assess the development projects, the resource management and the government activities or administration. The developed countries are using this process to assess their own development and cooperation agencies (Cleland and Gareis, 2006).

4.1 Objectives of Monitoring and Evaluation

The objectives of Monitoring and Evaluation include (Lewis, 2000):

- i) Measuring the ongoing project activities ('where we are').
- ii) Monitoring the project variables (cost, effort, scope, etc.) against the project management plan and the project performance baseline (where we should be).
- iii) Identify corrective actions to address issues and risks properly (How can we get on track again).
- iv) Influencing the factors that could circumvent integrated change control so only approved changes are implemented.

The purpose of using monitoring and evaluation as part of project management is to improve the project implementation in order to both achieve and enhance the impacts of the project.

A good monitoring and evaluation system will help in the following:

- i) Clarify what impact the project is expected to have.
- ii) Decide how progress and impact will be assessed.
- iii) Gather and analyze the necessary information for tracking progress and impact, and

- iv) Explain the reasons for success and failure, and agree on how to use this information to improve future actions.

5.0 Project Closure

This is the last stage in project management and the most often neglected one. This is done to mark the end of a project. It involves verifying that all the proposed tasks have been accomplished. Its purpose is to resolve any open issues, complete any paperwork required for formal completion of the project, and gather information useful for evaluating project performance for future reference (Perkins et al., 2003). Bringing a project to a successful conclusion requires close attention to several different managerial functions. More than any other project management process, project closeout requires an extremely diverse set of technical, organizational, and leadership skill. The closing process consists of two sub-processes: Contract closeout and Administrative closure. Contract Closeout is where remaining contract issues are settled while the administrative closure is where formal documents terminating the project are generated, and an appropriate history of project performance and lessons learned is gathered.

6.0 Case Study

Pells (2011) published an article stating the different project management tools/techniques to plan the wedding of Prince Williams and Catherine Elizabeth Middleton in April, 2011 and how using the method systematically made the event planning less stressful and the outcome colourful. Wedding was defined as a project because it is a temporal endeavor, having a defined beginning and ending undertaken to create a unique product or service, it is also a planned interrelated task to be executed over a fixed period and within a fixed cost and other limitations. The wedding was a spectacular/royal one and was attended by 1,900 guests and was also viewed by many in all parts of the world. The aspects of the royal wedding included: intense media coverage, security requirements, the ceremony, the location, the wedding gown, the wedding party, the guests, the reception, cost, risks and stakeholders. To achieve this, work breakdown structure, activity checklist, critical path network, project schedule, cost estimate and budget, risk management plan, stakeholders plan, communication plan, project administration, integration and control (project management techniques) were used in organizing the wedding.

6.1 Conclusion

Project management is the discipline of carefully projecting or planning, organizing, motivating and controlling resources to achieve specific goals and meet specific success criteria. The systems approach involved in project management follows particular order from project planning, project implementation, project monitoring and evaluation and lastly closure. Project planning is used to organize different areas of a project, including project plans, workloads and the management of teams and individuals. It uses techniques such as Gantt charts, Critical path analysis, Work Breakdown Structure, Project Evaluation and Review Techniques to plan and subsequently report progress within the project environment. Project implementation consist of those processes preformed to complete the work defined in the project management plan to satisfy the project specifications which involves coordinating people and resources, etc. Monitoring and Evaluation process help improve the performance and achieves results with the goal of improving the current and future management outputs, outcomes and impact. Closure marks the end/completion of the project.

In conclusion, the various processes of project management (Planning, Implementation, Monitoring and control, closure) are set of discrete elements that are interrelated activities and actions performed together systematically to achieve a specified result, product and services, as shown in the case study.

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