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Review Article

Project Management Fundamentals: An Exploratory Approach

Simon Emmanuel Hart

Ph.D., Graduate School of Business Studies, Ignatius Ajuru University of Education, Port Harcourt, Rivers State, Nigeria.

I N F O

E-mail Id:
semart4god@gmail.com
Orcid Id:
https://orcid.org/0000-0002-4987-6340

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A B S T R A C T

This paper explores fundamentals of project management. The purpose of this briefing study is to present key project management fundamentals and concepts to provide a common language for discussion, including what is: A project, project management, project success, a project manager, and a project management plan. The paper showed that project management is an integrative endeavor—an action, or failure to take action, in one area will usually affect other areas. The interactions may be straightforward and well-understood, or they may be subtle and uncertain, for example, a scope change will almost always affect project cost, but it may or may not affect team morale or product quality. These interactions often require trade-offs among project objectives—performance in one area may be enhanced only by sacrificing performance in another. Successful project management requires actively managing these interactions. To help in understanding the integrative nature of project management, and to emphasize the importance of integration, this document describes project management in terms of its component processes and their interactions. A project is temporary, unique, and the product of a multifaceted and progressively elaborated process that produces a solution for a specific objective. For the endeavor to be successful, the project must be accomplished on time, within budget, and to the appropriate degree required to satisfy the objective. For success to be achieved, the project manager must be skilled and operate in an environment that enables a project team to function. Excellence in project management should be viewed as a positive trend in the performance of successful projects.

Keywords: Project Management Fundamentals, Project Success, Project Manager, and Project Management Plan

Introduction

Successful project management has several significant characteristics. Realisation of these objectives requires systematic planning and careful implementation. To this effect, application of knowledge, skill, tools and techniques in the project environment, refers to project management. Project management in recent years has proliferated, reaching new heights of sophistication. It has emerged as a distinct area of management practises to meet the challenges of new economic environment, globalisation process, rapid technological advancement, and quality concerns of the stakeholders. A project in general refers to a new endeavor with specific objective and varies so widely that it is very difficult to precisely define it. Some of the commonly quoted definitions are as follows. A project is a temporary endeavor undertaken to create a unique product or service or result. Project management is an integrative

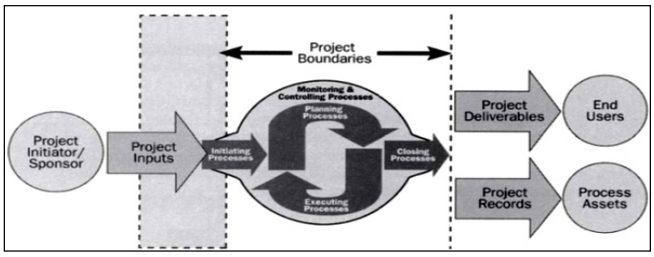
endeavor—an action, or failure to take action, in one area will usually affect other areas. The interactions may be straightforward and well-understood, or they may be subtle and uncertain, for example, a scope change will almost always affect project cost, but it may or may not affect team morale or product quality. These interactions often require trade-offs among project objectives—performance in one area may be enhanced only by sacrificing performance in another. Successful project management requires actively managing these interactions. To help in understanding the integrative nature of project management, and to emphasise the importance of integration, this document describes project management in terms of its component processes and their interactions.

To understand the value of project management, it is necessary to understand the fundamental nature of a project; the core characteristics of project management processes; how success is evaluated, the roles, responsibilities, and activities of a project manager and the expertise required; and the context in which projects are performed, conceptually illustrated by Figure 1.

The purpose of this briefing study is to present key project management fundamentals and concepts to provide a common language for discussion, including what is:

i) A project
ii) Project management
iii) Project success
iv) A project manager
v) A project management plan

Throughout this document, references are made to The Project Management Institute's (PMI) Project Management Body of Knowledge (PMBOK®). Developed over the past 30 years, the PMBOK is a collection and organisation of knowledge on the project management profession. It is widely accepted to include the core elements of successful project management practices. It is a regularly updated and internationally referenced standard (ANSI /PMI 99-001- 2004) and provides a basis for universal discourse on practices. Most modern academic and practical publications on the subject of project management reference the PMBOK, adopt its methodology, and incorporate its terminology



A Guide to the Project Management Body of Knowledge: PMBOK® Guide, 3rd Edition. Newtown Square, Pennsylvania, Project Management Institute, 2004, p. 43.

Figure 1.Project Management Institute

What is a Project?

The fundamental nature of a project is that it is a "temporary endeavor undertaken to create a unique product, service, or result." Projects are from operations and from and programmes. A project is a unique process, consist of a set of coordinated and controlled activities with start and finish dates, undertaken to achieve an objective conforming to specific requirements, including the constraints of time cost and resource. Examples of project include Developing a watershed, Creating irrigation facility, Developing new variety of crop, Developing new breed of an animal, Developing agroprocessing centre, Constructing farm building, sting a concentrated feed plant etc. It may be noted that each of these projects differ in composition, type, scope, size and time.

- **Temporary Endeavor:** To be temporary signifies that there is a discrete and definable commencement and conclusion; the management of a project requires tailored activities to support this characteristic, as such, a key indicator of project success is how it performs against its schedule—that it, does is start and end on time.
- **Unique Deliverable:** The uniqueness of the deliverable, whether it is a product, service, or result, requires a special approach in that there may not be a pre-existing blueprint for the project's execution and there may not be a need to repeat the project once it is completed. Uniqueness does not mean that there are no similarities to other projects, but that the scope for a particular project has deliverables that must be produced within constraints, through risks, with specific resources, at a specific place, and within a certain period; therefore, the process to produce the deliverable as well as the deliverable itself is unique.
- **Progressive Elaboration:** This unique process and deliverable produces the third characteristic of a project: progressive elaboration. Project management is a group of interrelated processes, implemented in a progressively elaborative manner, in which to produce the deliverable. Progressive elaboration is the revealing and focusing of details through time, for example, in the engineering design process, a general and broad concept may be a starting point for the design team; but through the design process, the concept is narrowed to a specific scope and is further elaborated to achieve the completed design; moreover, it may continue to be elaborated and not be finalized until the product, service, or result is delivered.
- **Other "Projects":** A clarification should be made with respect to Reclamation language. In terms of repossession, a project is typically a congressionally authorised or directed activity that allows repossession to do something specific. Traditionally, projects are

groups of infrastructure, such as the Central Arizona Project, the Lower Colorado Dams Project, or the Central Valley Project. The Reclamation "project" activities would range from the traditional planning, designing, and building of structures, to negotiating and signing delivery contracts, developing operations plans, and completing environmental compliance documents. In historic Reclamation vernacular, the operation and maintenance of the completed project is also often considered as part of the "project." Additionally at times in Reclamation, the people managing projects are often referred to as something other than project managers—they may be called team leaders, coordinators, activity managers or program managers; people managing "projects" may be called area managers or facility managers. Because of these connotations, care should be taken to distinguish between Reclamation "projects" and projects as defined above.

Project Characteristics

Despite above diversities, projects share the following common characteristics.

i) Unique in nature.
ii) Have definite objectives (goals) to achieve.
iii) Requires set of resources.
iv) Have a specific time frame for completion with a definite start and finish.
v) Involves risk and uncertainty.
vi) Requires cross-functional teams and interdisciplinary approach.

Project versus Operation

The operations of an organisation are continuing and repetitive activities that are executed to achieve its mission and sustain the business, but without a definable end to its performance and without a unique output—that is, it is not produced or provided only once.

Project Versus Programme

A project differs from a program in that "a program is a group of related projects managed in a coordinated way to obtain benefits and control not available from managing them individually. Programs may include elements or related work outside the scope of discrete projects in the program". Furthermore, programs often involve a series of repetitive or cyclical undertakings. In Reclamation, a program is typically a group of projects administered by Reclamation.

Reclamation programs do not have to be specifically authorised, and a program's schedule may continue past any individual project. Examples of Reclamation programs are the Safety of Dams Program, the RAX Program, and the Title 16 Programme.

Defining Project Management

Project management is the process of the application of knowledge, skills, tools, and techniques to project activities to meet project requirements". That is, project management is an interrelated group of processes that enables the project team to achieve a successful project. These processes manage inputs to and produce outputs from specific activities; the progression from input to output to the nucleus of project management and requires integration and iteration, for example, a feasibility report could be an input to a design phase; the output of a design phase could be a set of plans and specifications. This progression requires project management acumen, expertise, tools and techniques, including risk management, contingency development, and change control. Figure 1 illustrates the project context, its conceptual boundaries, or scope lines, as well as the process groups required to manage the inputs and deliver the outputs.

Process Groups

The project management process groups depicted in Figure 1 are initiating, planning, executing, monitoring controlling, and closing.

Initiating defines and authorises the project or a project phase.

Planning defines and refines objectives and plans the course of action required to attain the objectives and scope that the project was undertaken to address.

Executing integrates people and other resources to carry out the project management plan for the project.

Monitoring and controlling regularly measures and monitors progress to identify variances from the project management plan so that corrective action can be taken when necessary to meet project objectives.

Closing formalises acceptance of the product, service, or result and brings the project or a project phase to an orderly end. Figure 2 illustrates the relative depth, breadth, and interrelationship between these process groups.

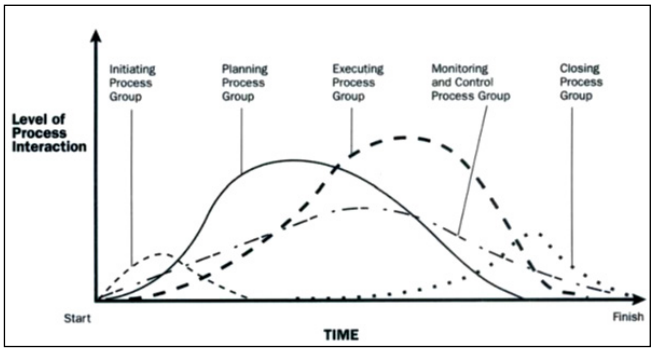


Figure 2.The Relative Depth, Breadth, and Interrelationship Between these Process Groups

Several significant observations regarding the nature of project management can be made from this figure. The breadth or range of project management is comprehensive—that is, it begins with initiating and continues through closing; these processes are coincident with the start and end of the specific project itself, respectively. Monitoring and controlling occur throughout the duration of the project and have a range relatively similar to that of executing. Indicating a project's temporary nature and the importance of the timing of the deliverable, closing begins relatively shortly after initiating concludes. Planning, monitoring and controlling have a collective depth similar to that of executing, illustrating that these activities require a level of effort and have a implication similar to that of constructing the product, providing the service, or producing the result.

Process Group Interaction

The level of interaction of the five processes indicates a strong relational dependence not exclusive of one another. One process does not simply end and the next one begins. The presence of this interrelationship and range is a function of progressive elaboration. Projects are executed in increments and details are exposed and developed through the progression of time—objectives are developed, discoveries are made; investigations, studies, and surveys are completed; analysis is performed; constraints are changed; resources are amended; contingencies are exercised; changes are managed; risks are mitigated; and Force Majeure (unforeseeable or unpreventable circumstances) occurs.

To manage the breadth or range of a project, active and proactive project management is required throughout the duration of the project. It cannot be simply initiated and/or planned and left alone; it must be continually planned, monitored and controlled. Sustained reactive project management is indicative of incomplete or absent planning and/or monitoring and controlling.

Project Phases Versus Process Groups

Project management process groups are not project phases. The process groups may need to be repeated for each phase, such as study, programming, engineering, procurement, construction, and commissioning. A process group or project phase is not discrete; they are interdependent and require integration. Also, project management must ensure continuity as a project progresses through processes and phases.

What Is Project Success?

A standard must be established by which to define and measure project success. Fundamentally, project success is the delivery of the required product, service, or result on time and within budget. To meet these objectives is to deliver a quality project. PMI 2004 illustrates project quality through the concept of the triple constraint—project scope, time and cost. Project quality is affected by balancing these three interrelated factors. "The relationship among these factors is such that if any one of the three factors change, at least one other factor is likely to be affected." Figure 3 illustrates this constrained relationship, sometimes called the "iron triangle."

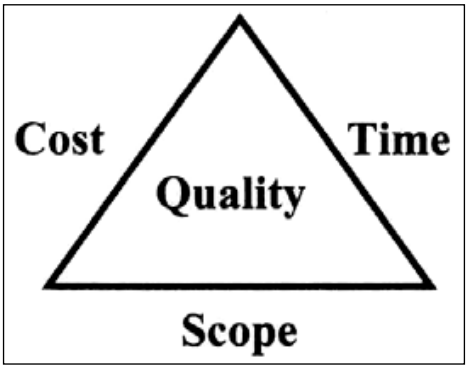


Figure 3.The Iron Triangle

Cost and time are intuitive, but the role played by scope warrants further discussion. To understand the significance of scope, one must appreciate the relationship between scope and the project objectives. For the scope to contribute to project quality, it must be managed to meet the demands of the project objective by reliably providing the required functions, nothing more or nothing less. It is not simply a matter of keeping the scope from creeping, or a matter of completing the cheapest and fastest project; it is establishing the appropriate scope and delivering the commensurate product, service, or result.

Project Manager

The key responsibility of the project manager is to successfully accomplish the project objectives by balancing the competing demands for quality, scope, time, and cost. Derivative responsibilities include identifying the project requirements; establishing clear and achievable objectives; and adapting the specifications, plans, and approach to the different concerns and expectations of the various stakeholders. Fundamentally, the project manager must direct the project from its inputs, through its nucleus, to delivery of its outputs. In order to accomplish these multifaceted responsibilities, the roles of the project manager include that of a leader, administrator, entrepreneur, facilitator, arbitrator and mediator, liaison, and coordinator.

The project manager must lead teams to operate cross functionally towards a common objective while assuring cohesiveness and continuity as the project acts as the key catalyst to stimulate effective communication and coordination between design, procurement and construction activities". In order to effectively manage

these responsibilities and assume these roles, a project manager must have experience in the following project management knowledge areas: project integration, scope, time, cost, quality, human resources, communications, risk, and procurement management.

Project Management Plan (PMP)

A project management plan is a fundamental tool for the project manager to deliver the project successfully. This document is a strategic and formalised roadmap to accomplish the project's objectives by describing how the project is to be executed, monitored and controlled, which includes creating a project work breakdown structure, identifying and planning to mitigate risk, identifying manners in which to effectively communicate with stakeholders and other project team members, and developing a plan to manage changes. It is essentially a guide for executing the project, and a manner in which to gain buy-in and approval from stakeholders and sponsors prior to commencement. This plan is a living document that is updated and revised throughout the project at strategic milestones or significant events to accommodate the progressive, elaborative nature of the project. The project management plan will vary based on size, complexity, risk, and/or sensitivity of the project. Implementing the project management plan requires competency in all of the project management knowledge areas and is critical to the success of the project.

Conclusion

A project is temporary, unique, and the product of a multifaceted and progressively elaborated process that produces a solution for a specific objective. For the endeavor to be successful, the project must be accomplished on time, within budget, and to the appropriate degree required to satisfy the objective. For success to be achieved, the project manager must be skilled and operate in an environment that enables a project team to function. Excellence in project management should be viewed as a positive trend in the performance of successful projects.

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