Managing Projects: Methodology

Customizable and Adaptable Methodology for Managing Projects

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Project Management II

The Customizable and Adaptable Methodology for Managing Projects™

Project Management II: The Customizable and Adaptable Methodology for Managing Projects™
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Contents

Acknowledgements

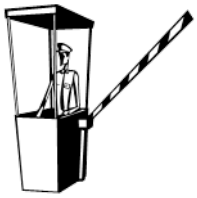
As this is a lengthy chapter, it has been placed in Part I. Specifically for this Part, I would like to emphasize the contributions of Luc Bauwmans, Nada Chaban, and Youssef Saad.

Icons and Their Use

The following are icons that we use in various sections of this work.

This icon represents a 'deliverable'. A deliverable in project management is a defined work item (scope) that when finished, is **delivered** to management or a client. The deliverable could be a report, a design package, a software tool, or even a physical facility, like a factory. The deliverable can be small and require hours or days to deliver or could be substantial requiring weeks or months to finish. The deliverables discussed in this Series are typically the main stage deliverables, which a project team completes with each stage or sub-stage.

The second icon represents 'further reading'. We use this whenever we encourage the reader to refer to other sources. This way, the author can maintain focus on the new content in this Series and avoid too much detail on topics that other references may cover better. The reader can find a partial list of resources in Appendix D and may want to explore these topics using search or other reference tools.



This icon represents a 'stage gate' or a control point, which is a fundamental concept in the stage gate approach, which we describe in this Series. Stage gates are key elements of governance and control to ensure alignment and flow of the project in alignment with established objectives. They are applied along the project life span from idea to closure.

This icon represents case studies. In this Series, we share many stories and case studies to illustrate points in each Part. In order not to disturb comprehension of the main points, we typically place the case studies in text boxes so the reader can skip them for review later. The author has direct experience with most of the case studies that we present in this Series.

We use this last icon when we aim to persuade the reader to ponder the open questions that we address. Some of these questions could be provocative, controversial, or challenge conventional wisdom. Notwithstanding the author's particular views, he understands that managers legitimately have differing views of the same circumstances; we expect the readers to develop their own opinions, and respect that such opinions might contradict what the author presents.

The Project Management Series

1 Introduction

Part I contains the full introduction of the methodology and the eBook series, and should be reviewed prior to this Part III since that introductory Part forms the foundation for the detailed concepts below.

2 The Series Four eBooks

The Series is in four Parts, four eBooks.[1] It is important to note that we are publishing these eBooks together and they are integrated. One can learn from one Part or even a few chapters. However, for better understanding on how to apply this project management approach, a reader needs to cover all four parts.

The four Parts are:

- Part I (eBook 1): This is the first Part and it is in two sections. Section 1 discusses the initial concepts along with project management challenges and opportunities. Section 2 offers a brief introduction of the project management model and reasons behind its development. This Part also includes alignment to international standards, most specifically the PMBOK® Guide.[2]
- Part II (eBook 2): In this second Part, the reader will find an in-depth description of each stage of the model. The author elaborates the core concepts of each stage and explains the sequence of events, stage deliverables, and stage gates. Further, within each chapter, the author maps the PMBOK® Guide (PMBOK Guide 2013) process groups to the appropriate stage and the overall project life span.[3]
- Part III (eBook 3): This contains essential topics that are not limited to a project stage but relate to the full project life span, in an '**across the project life span'** manner. These topics include project approvals, estimating, control, risk, project success, and project stakeholders. Another section in Part III discusses the model's customization and adaptation features, along with potential pitfalls.
- Part IV (eBook 4): This final Part shifts from the Series' 'what and why' of the model into its 'how to apply' explanation. Most of this Part presents a complete sample project[4], supplemented by examples from workshops on tailoring the model to different application areas and project domains.[5]

3 Preface to Part II

If you have not had a chance to read Part I of this Series, we encourage you to read it first; or at least read Chapter 6.

Chapter 6 is an introduction to the standard model and provides the high-level explanation of The Customizable and Adaptable Methodology for Managing Projects™.

Readers who are PMI credential holders, or preparing for one, read Chapters 7 and 8 in addition to Chapter 6.

Figure 1 presents an image of the standard model for easy reference.

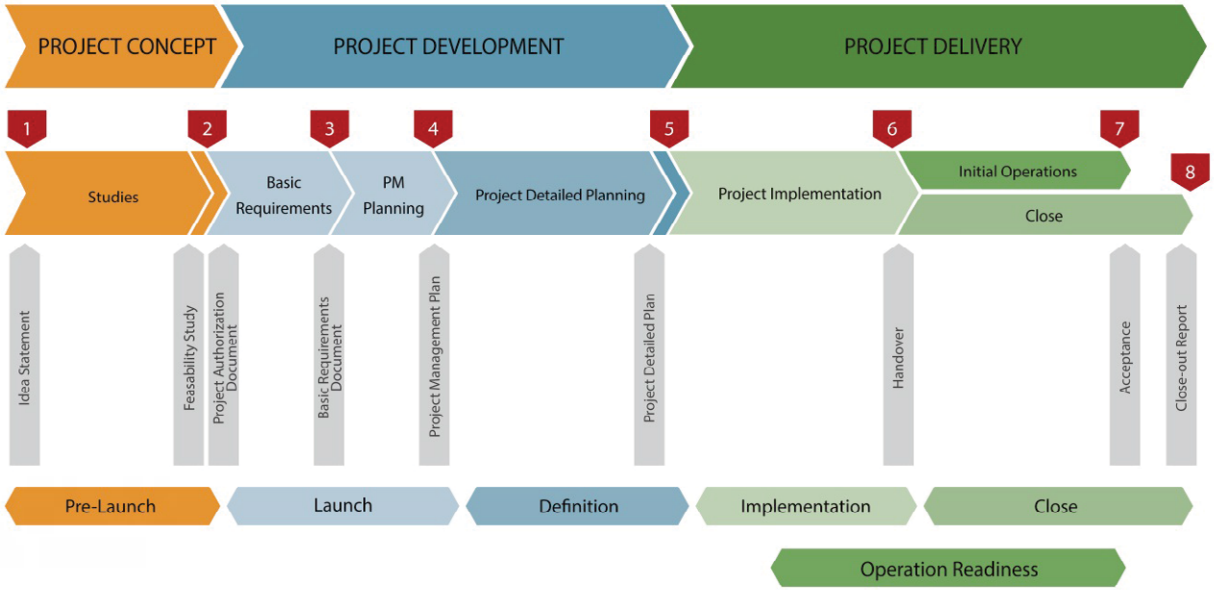


Figure 1: The Customizable and Adaptable Methodology for Managing Projects™ (CAM2P™)

Section 1:
Project Concept Phase

1 Project Pre-Launch Stage

1.1 The Stage Overview

The first stage on the project life span of ***The Customizable and Adaptable Methodology for Managing Projects™ (CAM²P™)*** is the project pre-launch stage. In this case, the project pre-launch stage aligns with the project concept phase.

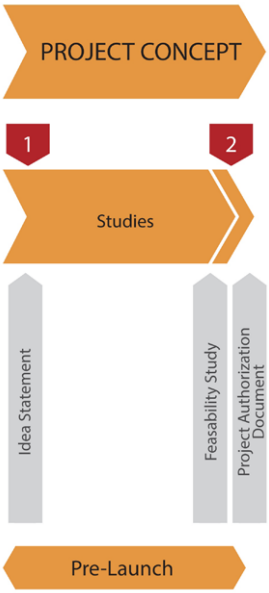


Figure 2: Project Pre-Launch Stage

1. The focus of this stage is to understand and validate the idea for a new project. If the project is feasible and is a priority, the organization will authorize it.
2. The time span of the stage is from idea statement, to project authorization document.
3. The main stage deliverables are the idea statement, the feasibility study, and the project authorization document.
4. The stage gates are stage gates one and two (SG1 and SG2) with the first about the project alignment to the organization strategic objectives and the second stage gate for review of the feasibility study, project prioritization, and the go/no-go decision.

1.2 The Sequence of Events

1. Any project starts with an idea, a driver, a trigger, or whatever else one might call it. The idea statement must be concise but clear, in order for management[6] to make the initial decision. The process is the idea generator[7] drafts the idea statement and submits it to management for a decision.

2. The idea presentation must be at the right organizational level and at a formal stage gate review.

Figure 3: Project Pre-Launch Stage Sequence

In CAM²P™, we suggest that the main objective of stage gate one (SG1) is alignment with the organization's strategic objectives. There could be other factors to consider at this stage gate, in addition, to strategic alignment, which would be a function of the organizational culture and policies.

3. With approval at SG1, the organization will appoints a project sponsor[8] to assume leadership for the project, who in turn initiate a feasibility study. The feasibility study is the stage focus. It would require most of the effort during the stage. The author advocates that the organization should have project management involved at this stage.
4. With the feasibility study complete, then it is time to go through another gate, stage gate two (SG2). One of the key objectives of this gate is to verify that the feasibility study is in accordance with the organizational guidelines, or standards, and that the project is feasible. Satisfying the feasibility question leads to the second objective of SG2, which is to decide if the project is a priority[9] and should proceed to the next stage. In other words, this is the time for the initial[10] go/no-go decision.
5. If there is a 'go' decision, the next step is for the sponsor to develop and issue the project authorization document (PAD), officially launching the project. The narrow chevron, after 'studies' in Figure 2, represents the time the sponsor and team need to develop the PAD.

1.3 The Shapes

This would be a good place to remind the readers of the shapes that we are using here, primarily the chevron symbol, to reflect that certain phases – or components of a phase – are sequential but with some overlap. For example, as the team is closing the feasibility study documentation, the sponsor could already be working on the PAD.

For the stage shape, we are using two sided arrows since the actual 'start and end' points of a stage can slide in line with organizational policies and culture. However, we recommend that organization fix these points when they customize and adapt the methodology.

The deliverables and stage gates shapes have no particular meaning except to indicate the point on the project life span where they occur.

1.4 Mapping the Process Groups

If we refer to the PMBOK® Guide (*A Guide to the Project Management Body of Knowledge®*), this stage is outside of the project, it is pre-project. This might be semantics but the Guide makes this distinction. However, per CAM²P™, the project life span starts with the idea statement, and the project pre-launch stage is an essential part of the project.

Chapter 8, Part I, presented the alignment of CAM2P™ to the PMBOK® Guide and introduced the five process groups. In this Chapter, and the rest of the Chapters of this eBook (Part II), we show how to map the process groups to the given stage, since the process groups repeat in every stage.

1. **Initiating** this stage takes place once management approves the idea statement at SG1. Initiating the stage is authorizing the feasibility study to validate the idea. In accordance with PMBOK® Guide, we should issue a **stage** charter[11].
2. **Planning**: team[12] will start to plan the stage. The plan is for conducting the study and any other work that is necessary for the organization to be able to make a decision at stag gate 2.
3. **Executing**: next the team would move ahead to execute the stage work. Executing the stage work is conducting the feasibility study, and any other work per the stage plan.
4. **Monitoring and controlling** would be happening throughout the stage.
   For this stage, control is a challenge since there is too much ambiguity at this point. The ambiguity comes from the fact that the team does not the details of the project yet, only a conceptual idea. Despite the ambiguity, control is necessary to ensure the development of a proper study that is in line with the idea statement.
5. **Closing**: Finally, closing this stage would happen after stage gate two (SG2) and the PAD. Here, the team will develop and issue the stage close out report[13].

1.5 Special Note about Process Groups

We must emphasize before continuing[14] and remind the reader that project management effort is a function of the project size, importance, and complexity.

For small/simple projects, the effort required for initiating and planning the stage might be limited or almost negligible. It may even be verbal or through emails with no formal documentation.

On the other hands, if the projects were moderate in size, large, or complex, the effort can be substantial and require a high level of resources, effort, and time.

If a project does not require formal documentation, this does not mean the team should not consider the process groups, or ignore the project management thinking process. Although we advocate proper documentation even for small projects, it is up to the organization to decide what is best for its own environment.

1.6 The Idea Statement

The idea for a project could come from anyone within the organization. It could come from an employee, a strategic business unit, a department or executive management. It could be for a new concept or a modification of something existing. Organizations should have a process for idea generation, review, and disposition, which could be part of the business planning process or strategic planning. Some organizations could even have an innovation management process where ideas could come from anywhere, including their customers.

Regardless of what idea management system exists; we advocate that the idea for a new project must go through an idea management system or project approval process. In small organizations, the owner of the idea might be able to present the idea directly to senior or executive management. In larger organizations, there might be layers of reviews. However, we prefer that the owner of the idea should be able to present their initiative to senior management, or the decision makers, where possible.

The idea presentation must be clear, define the key concept, and identify the strategic value to the organization. The idea definition and presentation must be brief. Management could require additional work prior to deciding on an idea, which is normal.

A Potential Pitfall

The organization must be careful not to fall in the trap of spending too much time on idea definition or confuse the work required for idea definition versus what the organization should do in a feasibility study.

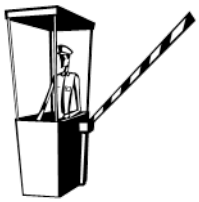
In well-established and mature organizations, it is understood that at the time of the idea introduction, no one, including the idea originator, has all the answers yet, and some ambiguity about the details is not only accepted but also expected. What this means is that we do not want an idea originator to come forward after she has already planned the project. This later situation is not a sign of a good idea statement rather it is a clear indicator of a system failure where team members, the idea generator and possibly others, are using company resources to work on projects that management has not authorized.

The key here is to perform enough work to understand the idea so management can decide on a path forward, no more, no less. Of course, the level of details is a function of the level of empowerment within the organization and the organizational culture.

Figure 4: Idea Statement Minimal Requirements

At times, clients and colleagues ask us for a template or a form for idea documentation. Our answer: it is just a short paragraph, a few sentences or slides. If the idea is not clear in a few minutes, than the idea generator fails in presenting the idea. What we advocate is that the idea statement shall include the idea and the driver behind it – the justification. In addition to the 'what and why'), we suggest including alignment to strategic direction!

1.7 Stage Gate One (SG1): Idea Approval



It is time for bringing in strategic project management into the discussion.

As stated in Part I, the project pre-launch stage is part of the strategic aspects in the methodology, and SG1 is about strategic alignment. Every project must be in line with the organizational strategic direction and objectives. If we do not consider this strategic view as a priority, then project management would not be highly effective in contributing to organizational long-term success. There are side benefits from the first stage gate being about the project alignment to the organization strategic objectives or direction. There are:

- If strategic alignment is an ingrained principle in the culture of the organization, and
- Professionals within the organization have 'a line of sight'[15] on how their roles and work contribute to organizational success, then
- The idea originators would suggest ideas that will contribute to the long-term success of the organization, instead of wasting time on ideas that would not align to the core business.
- In other words, projects are value-improving efforts in organizations and management should consider them carefully.

> *"There is nothing as wasteful as doing with great efficiency that which does not have to be done at all."*
>
> Anonymous

In closing, who approves the idea?

It is a function of organizational size and culture. In some organizations, empowered line managers or senior managers might be able to do so up to certain pre-authorized limits or any other predefined criteria.

1.8 The Feasibility Study

A few organizations might pursue project bases on a business case. Some confuse the business case with feasibility and proceed from the idea statement straight into authorization or even directly to planning. Business case is part of the project justification but great ideas might not be feasible. It would be a waste of effort and resources if the organization discovers a project is not feasible late during project development or delivery! Therefore, it is essential to conduct a feasibility study.

The feasibility study is primarily about 'validating the idea'. This means:

- The business case is valid and there is a need for the project – market demand
- The organization is have the resources to deliver a successful project, and
- The organization is expecting to realize benefits from the product of the project.

The following are the relevant information and factors to consider.

1.8.1 Project Management Involvement

The feasibility study is an essential requirement for any project, but because organizations perform the study prior to the project authorization, one can understand that, traditionally, organizations do not mobilize the project managers at this stage. However, we are advocating reversing this situation, and we advise assigning a project manager, or at least consult with project management, during the development of the study. This is not difficult in organizations that have a project/program management office (PMO), or project management department. If there is no project management function, management should consider having a project management expert on board, or at least consult with one, to help in the development of the feasibility study.

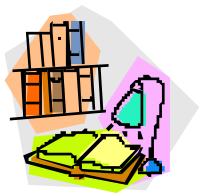
Why do we emphasize the need to have project management involvement at this stage? We do so because:

- At this stage, organizations often define time and cost requirements, which can become 'set in stones' in the minds of management.
- The organization's planners would use the cost and time information to perform their economic analysis, and make decisions. Faulty analysis can lead to a failed project.
- Moreover, many projects are only feasible within a relatively short window of opportunity due to market demand, commodity price, competition, or other factors. The feasibility study must address these situations.

These are some of the reasons, why it is necessary to have project management involvement, during the pre-launch stage. We also believe that when the project manager knows what led to the project, the business objectives, then the project manager is more sensitive to the project strategic objectives and requirements.

1.8.2 The Details of the Feasibility Study

What are the main factors to consider in a feasibility study?



We will summarize a few of them here, but note:

- Not all of the following factors would apply to all projects
- It would not be possible to list all factors, for all projects
- The actual factors to consider would depend on the type of the project, size, complexity, and domain.

1. **Technology evaluations**: depend on the domain or type of project, there might be factors related to the technical or technological aspects that the team must consider during this evaluation. This is especially true when the project requires the use of new, possibly unproven technology.

2. **Financial considerations**: does the project need financing or funding? What we mean here is funding outside the normal day-to-day operations; funds approved specifically to a project.
3. **Cost and time considerations**: these are factors for all type of projects. Cost and time are two variables that one uses for project planning control. Cost is different from financial considerations since the first deals with the cost of the project and the latter deals with funds' approval.
4. **Human aspects**: this is often an essential factor. Need to consider two aspects, resources capacity, and availability, in addition to, expertise and competency.
5. **Market evaluations**: market research is often necessary, for certain projects. Market research can be extensive due to its direct impact on profitability or justification for the project.
6. **Internal cross evaluations**: in medium to large organizations, there might be a need to search internally to assess what other functions are doing, in case of duplication of effort. It is possible, in an 'organizational silos' environment that one business unit might not know what another is doing.
7. **Location factor**: if the project requires a physical location then this could make an immense difference, with impact on many of the other factors listed here.
8. **Legal/regulatory considerations**: this might not be a factor for certain projects, but it would be for others. This includes licensing, permitting, and other legal factors.
9. **Risks**: the feasibility study itself is a form of risk assessment with a focus on the business risks and whether the project threats are too high to continue. In other words, a project is typically an opportunity the organization is considering to exploit or not. If the threats are high or do not justify the benefits, the organization will not continue with the project.

   In addition to the question of whether to exploit the opportunity or not, the organization need to consider the specific risks. During the feasibility study, the focus would be on risks related to the business, such as market conditions, competition, and market demand.

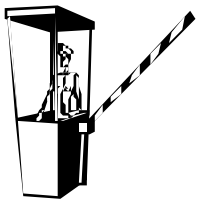
   Risk does not have to be a separate topic in the study if the team embeds it in each of the above topics. However, we do separate the discussion to emphasize it, and to indicate that these risks are different from the risks the project manager will manage during the project development and delivery phases. It is also worth noting that once management approves the project at SG2, they must have taken some or all of these earlier risks into consideration[16].

10. **Social or community case**: For social initiatives, by not-for-profit or government organizations, a key factor would be the social case, in lieu of the business case.
11. **Other considerations**: we urge the readers not to narrow their considerations on what we list here; think out of the box about your own project environment.

1.8.3 Feasibility Study Potential Pitfall

Due to the nature of most projects with high ambiguity at this early project timing, the team will need to make many assumptions. Human nature has taught us that if the organization is favoring the project, they could short cut the process; amplify the positive aspects and assumptions whereas they would trivialize the negative aspects.

1.9 Stage Gate Two (SG2): Project Initial Approval



The feasibility study is an essential requirement within the project life span and would lead to stage gate two (SG2). This control point would provide management with the opportunity to validate that the team did perform a proper feasibility study. If management were satisfied with the level of effort, and were comfortable that the study is not biased, then management would consider the result of the study and recommendations.

In other words, the vital question: is the project feasible?

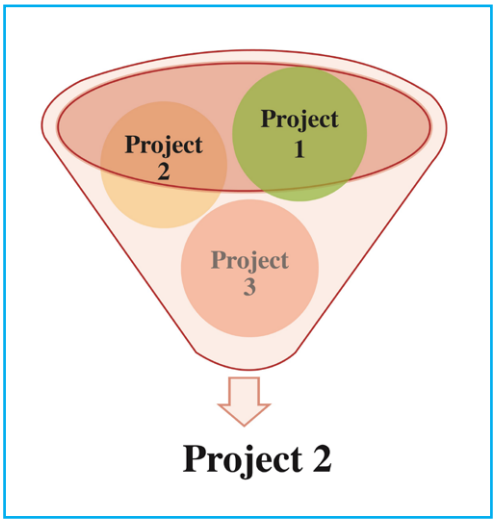


Figure 5: Project Prioritization

With an answer to the previous question, management will have enough information to make a decision on whether to launch the project or not, move into the next phase. However, we recommend that management should not make this decision based on the project feasibility only. Before they make the final decision, we advocate considering the project as a part of a pool of other projects, a portfolio of projects. In this case, management should approve the high priority projects using whatever criteria they believe appropriate for their organization strategic objectives. This is projects' prioritization, which is part of portfolio management.

If the decision is a go, management, represented by a steering committee and/or a project sponsor, will appoint the project manager if one is not already onboard. The sponsor will develop the project authorization document.

1.10 Project Authorization Document

1.10.1 Purpose of the Project Authorization Document

The project authorization document (PAD) is the document that authorizes the project. What does that mean?

1. It announces to the organization that management authorized a new project and allows the use of company resources **for the project**.
2. It identifies the project manager and her authority.
3. It serves as a key reference and control document for future work.

Does this mean the project manager can proceed with the project all the way to completion?

No.

What the PAD is telling us is that executive management has the clear intent to take the project to completion, yet they are only 'effectively' authorizing the next stage. The decision whether to continue with a project or not is revisited with subsequent stage gates as we will show in the next chapters.[17]

1.10.2 The Content of the Project Authorization Document[18]

How should the project authorization document looks like and what are its components? The PAD should be brief, ideally a page or two, build on what we have done before, and is the foundation for what to come. The components are:

1. **Product (Output) Description**: the product description is a repeat of the idea statement. A brief one to three sentences description of the product of the project.
2. **Project justification**: the idea statement included project justification. However, the feasibility study could provide more information to include here. The justification, like the description, is limited to a few sentences since there is no need to reiterate the feasibility study.
3. **Location**: if applicable, specify the location. For some projects, location can be a crucial factor with significant impact on the project economics and viability. Therefore, in those situations, we must address the location factor and alternatives in the feasibility study.
4. **Time and cost**: the project authorization document is not a schedule nor is it a cost estimate. However, it includes the expected completion date and possibly other **essential** milestones. If the project has a time constraint, or a window of opportunity, the PAD should include this condition. For cost, a rough order of magnitude estimate, a high-level cost estimate would be required. Management should understand that the estimates for time and cost at this time are rough approximations.
5. **Project manager**: CAM²P™ calls for the project manager to be onboard soon after SG1. If that did not happen, the project manager must be onboard at this time. In either case, the PAD is announcing the project to the organization and letting the stakeholders know who would be the project manager and her authority.
6. **Assumptions and Constraints**: At this time, it is important to list the major assumptions and constraints for the project.

    a) Assumptions are necessary as a by-product of the project development process (life span) and stage gate concept. Since it is not possible to know certain details about the project at this time, it is necessary to assume certain things. The project manager and the team must address these assumptions as the project progresses. These assumptions will become risks if the team does not address them when required.
    b) Constraints are restrictions imposed on the team by management, clients, nature, among other factors. These are the factors, which limit the team in one way or another. The project manager challenge is to deliver the project within the given constraints.

7. **Major risks**: the project manager and the team must address project related risks that would likely take place during the development and delivery of the project. Since it is too soon to conduct a detailed **project** risk identification and assessment, all what is required at this time is to document any major risks for the project that the organization is carrying over from the pre-launch stage.
8. **Stakeholders**: to start, it is essential to understand the difference between stakeholders and shareholders. Shareholders are those who have a financial interest in the project or the organization; own shares or are financial partners. On the other hand, stakeholders are all of those involved, with interest, or affected by the project.[19]
9. **Project Success**: if possible, the PAD should include the project success criteria. In some cases, the organization cannot establish all the measures of success at this time but must finalize during the project launch stage.[20]

1.11 Stage Summary

This is the first stage on the project life span of **The Customizable and Adaptable Methodology for Managing Projects™**.

We remind the reader that the PMBOK® Guide and other project management literature consider this stage outside the project, but we have a different view due to the strategic importance of this stage.

The focus of the stage is to understand and validate the idea for a new project; leading to project authorization. To reach project authorization, we have to conduct a proper feasibility study and management has to accept that this idea is feasible and is a priority in comparison to other potential projects.

There are two stage gates, SG1 and SG2, with the first being about alignment to strategic objectives, and the second is for project go/no-go decision. SG1 takes place quite early in the project life span, as soon as we have an idea presentation.

With the PAD, the project pre-launch stage is complete, and the main responsibility of the project day to day will shift from the sponsor to the project manager, with the sponsor remaining as the management representative on the project.

Finally, we remind the reader that project management effort is a function of the project size, importance, and complexity with small/simple projects requiring limited effort and large/complex effort demanding a high level of resources, effort, and time.

Section 2:
Project Development Phase

2 Project Launch Stage

2.1 The Stage Overview

The project development phase consists of two stages, the project launch stage, and the project definition stage.

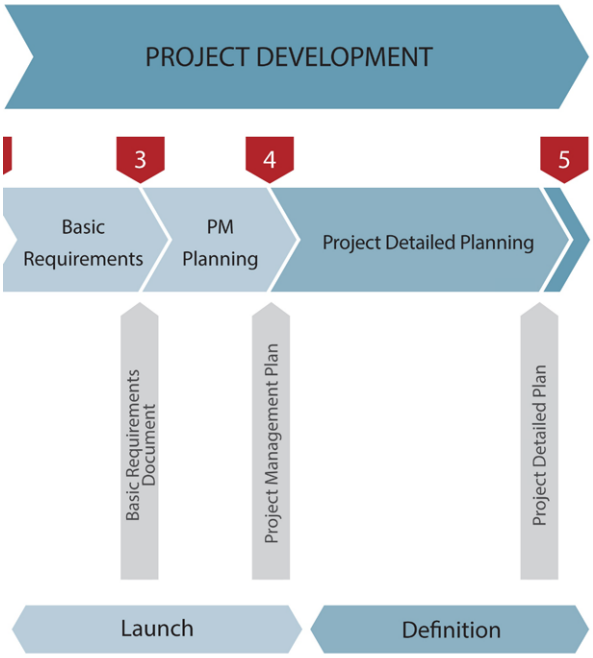


Figure 6: Project Launch Stage (Part of Project Development Phase)

We chose the word 'launch', to name the second CAM²P™ stage, in order to indicate that the organization has 'launched'. The project is now official and authorized. Once again, those who adopt this methodology in their business can choose whatever name they feel is a better fit for their environment.

The focus of this stage is to define the project basic requirements, establish the project management plan, and obtain advance funds if required.

The time span of the stage is from the issued project authorization document to approval of the project management plan at stage gate 4.

The major stage deliverables are the basic requirements document (BRD) and the project management plan (PM Plan). There can be other deliverables, which would be either subset, or independent, of the BRD and PM Plan; this is a factor of the project domain.

The stage gates are three and four, where SG3 is specific to the stakeholders' alignment on the project requirements, and SG4 is about management's approval of the project management strategy and plan. Further, with each of these stage gates, especially SG4, management could revisit the go/no-go decision.

2.2 The Sequence of Events

Based on the above, the sequence for this stage is per the following:

1. The project authorization document (PAD) marks the start of this stage.
2. The project manager and team review the PAD, identify other sources of information, and perform the necessary analysis to develop the project basic requirements document (BRD).

   Let us look at the above from a different angle.

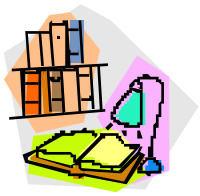
Figure 7: Developing the Basic Requirements Document

3. SG3 is required to validate that the project management team understand the requirements and is able to present its understanding to management. This step is necessary to ensure the alignment on the project requirements and objectives.
4. With alignment at this gate, it is time for the project management team to finalize the appropriate project life span model[21], decide on the project management strategy, and develop the project management plan.
5. On some projects, it is necessary to have an updated cost and time estimates with the project management plan. These estimates are more detailed than the estimates from feasibility study.
6. Finally, stage gate four (SG4) is another major control point, and it is essential to validate that the project is still viable and whether or not to continue with it. In some domains, this gate is very important in term of financial approval.[22]

2.3 Mapping the Process Groups

Similar to the discussion in the previous chapter, we map the process groups as they repeat for this stage.

1. The organization initiates this stage once the sponsor issue the PAD. In this case, the PAD is serving two purposes (a) it is the project charter, and (b) it is, indirectly, the charter for project launch stage.
2. The project manager and supporting team members will develop the stage plan(s)[23]. The plan will cover the stage work, which are the development of the BRD, and the PM Plan.



3. With the stage plan in place, it is time to execute (direct and manage) the stage work. Executing the stage work means developing the basic requirements document first, achieve stakeholders' alignment, develop the project management plan[24], and attain approval.
4. Monitoring and controlling would be happening throughout the stage. At this point in the project, the control is still a challenge but easier than the prior stage. Once again, although control is qualitative rather than quantitative, it is still essential. In the earlier stage, control was against the idea statement; in this stage, control is against the PAD.
5. Finally, closing this stage would happen with completion of the project management plan and after approval at stage gate four (SG4).

2.4 Developing the Basic Requirements

2.4.1 Basic Requirements Overview

Once again, the project authorization document is management, through the sponsor, communicating to the project manager, and organization that the project is a go. The project manager reviews the PAD, research other organizational resources, and start the work to define the basic requirements for the project.

At the completion of the BRD, it is the project manager turn to communicate with management on the team's understanding of the project, what the team must accomplish to deliver the project ultimate outcome.

Whenever we explain this model to participants in our classes, we find that this topic often leads to confusions on what are the basic requirements and why do we need a stage gate at the end of this segment? We will explain the content of the basic requirements document next, and address the 'why we need the gate' after the BRD.

2.4.2 The Basic Requirements Document

The following is the content of the BRD. Please note that some of the topics are similar to the PAD content, except that the BRD offers more details. Further, in the next stage, the project team will expand the BRD to develop the project detailed plan. We call this process 'project development', hence the name of the phase whereas the PMBOK® Guide uses the term 'progressive elaboration'.

The list below is not exclusive since in some domains we might have more or fewer topics to include in the BRD. Organizational preferences also have an impact on the BRD structure and content.

1. **Description of the project product**: the first step is to describe the output of the project, the product. At this point, any additional information that the team develops or gathers will include in the description. The team is not yet ready to produce the detailed scope of work; that is part of the project detailed plan.
2. **Characteristics**: the Thesaurus defines characteristics as "description, character, quality, features." Therefore, the BRD description of the product will include required features, where applicable. For example, a house is a product. A house that is a three story villa with huge windows and large open space for entertainment; these are features of the house. A garden to include a children pool and waterfall, these are also features.
3. **Expectations and requirements**: the project management team needs to be able to distinguish between expectations and requirements.

Figure 8: Transform Expectations to Requirements

Expectations are implicit, which, if we do not identify them properly, and understand them, will likely lead to lack of clarity, misunderstandings, not delivering the proper product, and ultimately the possible dissatisfaction of the client. Therefore, the challenge for the project management team (PMT) is to work with the client and all relevant stakeholders, internal or external, to explore for the expectations. Next, the PMT must do their best, to transform those implicit expectations into explicit requirements. One possible approach to help the PMT accomplish this task is a great deal of inquisitive questions of the client.

To clarify the previous paragraph: let us revisit the house example.

An implicit expectation might be "*we have a lot of friends (couples) who visit with us for vacation.*" Transform this to requirements: "*suggest providing two guest rooms that are master suites for privacy of the visitors.*" Another example of an expectation: "*we should be able to take advantage year around of the great weather here.*" Transform this to requirements: "*suggest providing nice outdoor facilities for relaxation and enjoyment of the weather.*"

4. **Alternatives evaluations**: the evaluation of alternatives to the project, scope, schedule, location, procurement approach would take place at various stages of the project, and in each stage, the alternatives can be different. Some of the alternatives could be due to the nature of the project; a house – could be one, two, or more stories. These are alternatives to consider. Should the house be standard house, a 'green' house, or a 'smart house'? During this stage, we are likely to introduce value management and value improvement practices and those will certainly lead to a few alternatives.

   Regardless of what alternatives the team considers, it would be best addressing these alternatives during the development of the basic requirements document and ideally, should not leave major alternatives open in the BRD. If there are open issues and alternatives, the project would be at a higher level of uncertainty, which is a threat to project objectives.

Appropriate Stakeholders

There is a 1974 movie, "**The Towering Inferno**," directed by John Guillermin. Steve McQueen and Paul Newman were the leading actors, with Newman acting as the architect that led the design work of a tower/skyscraper and McQueen a fire fighter captain.

During the opening ceremony for the tower, small fires started due to electrical problems (quality and cost cutting issues). The fires quickly spread and the whole tower was in danger along with the lives of many people who were celebrating the opening and many did indeed perish in the movie.

At the end of the movie, Steve McQueen turned to Paul Newman and said, "*One day you engineers are going to kill a thousand people in one of these things, if you do not ask us how to build one.*"

Obviously, the main point of the story is about ensuring that we get all stakeholders involved, even those who might not be within the performing organization, or that might not seem obvious. We have to think out of the box.

5. **Stakeholders' input**: when the team is working on converting expectations into requirements, it is crucial to ensure working with all relevant stakeholders and watch out of non-obvious stakeholders.

Refer to the text box for a story that demonstrates this point.

6. **Deliverables/high-level work breakdown structure**: from the above characteristics and other users' requirements identification, one can then develop a list of the key deliverables for the project.

   For the house example, the final deliverables (the output) are *three-story house, four bedrooms for the family and two master suites for guests, large space for entertainment indoor and outdoor, three-cars garage, landscape with children pool, waterfall, etc.* Note that these are high-level deliverables related to the final project product. As the project progress, the list of deliverables will grow; it is likely to grow significantly.

   With the major deliverables and requirements known, the team can develop the high-level work breakdown structure (WBS[25]). At this point, the WBS does not need to have significant details; possibly two to three levels only. As the team continues to develop the project, the WBS will grow in direct relation with the project size and level of details.

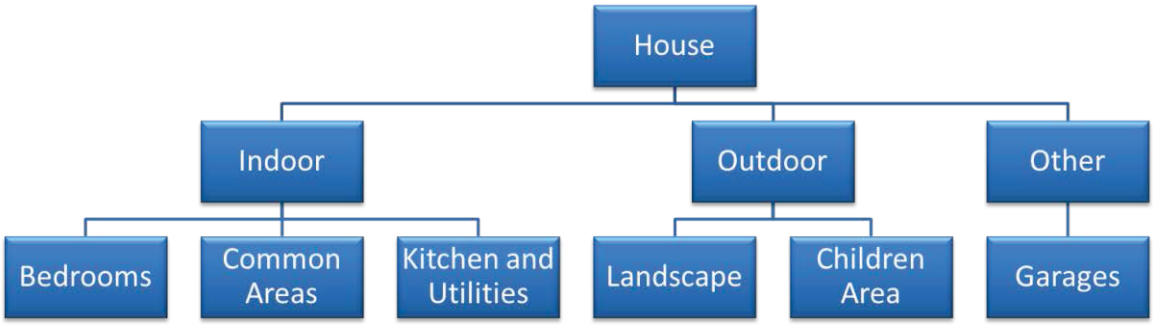
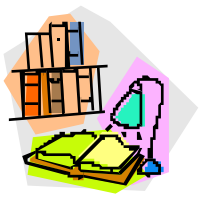


Figure 9: Sample High-Level WBS (House Example)

7. **Project boundaries**: sometime one of the best way to define something is to define what it is not. In project management that is the closest things to project boundaries, also referred to by some as "project framing." In other words, what is included in the project scope and what is not included. Boundaries are very important to draw and are crucial for clarity of the project and its components.
8. **Constraints and assumptions**: we have defined constraints and assumptions in the previous chapter. At this time, we need to revisit them to determine whether some constraints have been relaxed, removed, or new ones added. Further, since we are already progressing with the project, then we should be able to clear some of the assumptions due to additional research or work done. However, new assumptions might come in, as well.
9. **Acceptance criteria and success Factors**: we have seen many projects with no acceptance criteria defined and no success factors outlined either. The issue here is that the organization is settling on 'completion of work' as the only criteria.



What happen if the team did not complete part of the scope, would the organization accept the project product? If they do, for one reason or another, could one say the project is a success, failure, or 'challenged'?

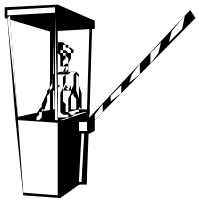
We might consider a project a success from a project management perspective if the team deliver it within time and cost parameters. Yet if, management wants to elevate project management into strategic project management then we need to consider and assess if the project succeeded in delivering what it was intended to deliver.

The challenge is to separate the concept of completion, from acceptance, and from success. The project launch stage is the right time to consider these parameters, although we should have also addressed some of them in the prior stage, prior to project authorization, but may be, not in details[26].

10. **Value Improving Practices**[27]: some of these practices are industry (domain) specific; therefore, they could apply on some projects but not on others. In either case, this stage is an ideal time during the project development phase to introduce the value improving practices since they will introduce possible alternatives.

    What are some of these practices? We list a few, such as constructability, schedule optimization, zero incidents (safety), front end planning, and project change management, among others[28].

2.5 Stage Gate Three (SG3): Stakeholders Alignment



With the BRD complete, it is an opportunity for executive management, the client, end users, operation and maintenance, project management, and other **appropriate stakeholders** to sit down again and review the work progress and the BRD. The main objective is for the stakeholders to reach an agreement on the project and to align on the expectations, requirements, WBS, and major deliverables.

For some types of projects, end users representatives might be working with project management team as an integrated team. In those situations, alignment would be taking place on an ongoing basis and; therefore, we would be able to expedite SG3; the decision in that case is just a formality.

In other situations, including small projects, one can even justify combining this gate with the next one.

Communication gaps

One scenario:

A manager tells a team member to develop a marketing plan without providing real documentation, charter, requirements definition … Three weeks later, the team member comes back with list of pricing for advertisements and an advertisement schedule and agreement.

Is this output acceptable?

Another scenario

Executive management asked a team member to write a book about a methodology. What is the project? Is it writing only or publishing? A team member might proceed and start working on publishing options since in his mind the intent of writing a book is to publish it. This might be true but is that what executive management wants?

As you can see, we need to have much more information defined and agreed to before we can proceed. If we do not, there is a high chance of wasted resources and effort.

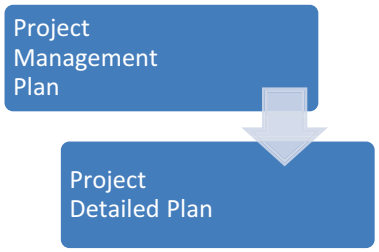
2.5.1 Importance of This Stage Gate

Unfortunately, it has been proven time and time again that communication gaps exist; we do not learn our lessons. If we do not ensure that all sides are talking about the same thing, the risk is that the project management team could run in one direction, which might not be the right direction or the direction required by executive management. Therefore, it is necessary to define the requirements and key deliverables and agree to them before we move forward and discover our mistakes later. This is crucial on major projects since a significant amount of work and at substantial cost would be required in the next stage. Therefore, we want to be absolutely sure of the scope and reach stakeholders alignment, and this is the core purpose of stage gate 3.

2.6 Project Planning

2.6.1 Project Management Plan versus Project Detailed Plan

There is often confusion on what is the project management plan. Is it the same thing as a project (detailed) plan or is it something else? Sometimes practitioners use these terms interchangeably. In the CAM²P™ model, they are two different things with the project management plan serving as an input to the project detailed plan.



The project management plan is about the overall management approach for the project; in other words 'how to' manage the project leading to delivering the final product. Whereas the project detailed plan provides the details for the project, which the team will use during the project delivery. The focus of the project detailed plan is to provide the details on the product and how to deliver it.

The project management plan is part of the project launch stage, and we will explain it in the next chapter's section. In the next stage, the project definition stage, we will cover the project detailed plan (PDP).

Could we combine the project management plan and project detailed plan? We can do so but only under special circumstances, which we will discuss in Part III of this Series. On the other hand, for major capital-intensive projects, we strongly advise **not** to combine them.

OK, per CAM²P™, they are different, so what is the project management plan?

Before explaining the components of the PM Plan let us address why planning should not be a phase or stage.

2.6.2 Why Project Planning Should Not Be a Phase

In more than one place in this eBook Series, we discussed the PMBOK® Guide process groups and compared them to the project life span. The Guide presents that the process groups repeat in every phase (or stage). Consequently, the planning process group and processes repeat in every phase. This was one of the reasons why in the CAM²P™ model, there is no 'planning' phase or stage. Yes, in the methodology, one will develop a project management plan and a project detailed plan but none of the phases or the stages carries the word 'planning' in its name.

In addition to the above, there is another reason why we highly recommend to organizations not to have a 'planning phase'; *refer to the box*. We have already established and will continue to do so throughout this eBook, and the whole Series, that planning takes place in every phase and stage. We even have to plan the project close stage. Therefore, planning is not a stage – it is a process – a process group per the PMBOK® Guide.

> It is common to hear the following question: "*how much effort should we spend on planning" or "how long should the project planning phase be.*"
>
> Our answer is "*first, there is no planning phase, and second planning is continuous throughout the project*."

If an organization chooses to have a planning stage, the risk is that practitioners will confuse planning as a process versus planning as a stage. This confusion can limit planning effort to this phase, which would increase the threats to attaining the project objectives. Just to clarify – planning here refers to all planning processes from all project management functions, such as scope, time, cost, risk, quality, safety, and others.

Now, if one shift the question *(from text box)* to "*within a phase, or stage, how long should planning takes?*" The answer, "it depends." Yes, it depends on the project size, complexity, importance, among other factors. As a time ratio, {time to plan divided by total time for the phase}, the ratio would be low for a project that are simple and highly repetitive, but for complex project, the ratio would be higher. What are the actual ratios and can we defined them proportionally? In our views, this is not relevant.

We close this topic by reminding the reader – this is not science; project management, especially planning, is a blend between, science, art, and a bit of psychology.

2.7 The Project Management Plan

2.7.1 Project Management Plan Overview

The team starts working on the project management plan after stakeholders' alignment at SG3. The project management plan key points are:

- It is the document, which takes into consideration the **whole project**
- It documents what already took place in the earlier stages
- It focuses on the remaining stages and the required effort to complete the project
- It formalizes the project life span, stages, stage gates, deliverables, and other key management requirements.

What are the project management plan major sections? What would it include?

It all depends on the organizational preference. Our interest is in ensuring that the team covers the essential elements of the project management plan.

2.7.2 How to Develop the Project Management Plan

Start by answering a few questions.

1. How to[29] define the project
2. How to manage the project
3. How to control the project
4. How to get ready for operations
5. How to close the project

Figure 10: Planning Essential Questions

Sometime, it makes sense to combine questions two and three into how to manage and control the project since some organizations prefer to have a project management and control plan; emphasizing control as an equal to management instead of a subset of management.

The project management plan is an essential document to use for project performance management and control. This plan is a control reference point to one of the dimensions of project success, which we discuss in Part III.

Figure 11 shows one possible hierarchy for the project management plan and Figure 12 shows a sample outline of a project management and control plan. Although these two figures represent similar content, the content is not identical, in order to show potential variations.

2.7.3 The General Sections

Figure 11: The Project Management Plan Hierarchy

2.7.3.1 Project Life Span Selection

One of the first things that the project management plan shall address is to verify the proper project life span method to use. In a way, this relates to the strategy for managing the project, the general approach.

The methodology is customizable and adaptable. Therefore, within an organization there could be more than one established project life span method to use by the project manager. This is a function of the project classification if the organization uses the concept of project classification.

In addition to the pre-established standard models that might exist in the organization, the project could have unique features that justify a change to an established model and organization should empower project managers to **recommend** modifications to reflect the proper approach for the given project. The emphasis on 'recommend' is to indicate that the project manager might not have the power to change the model but can recommend a change with justifications.

2.7.3.2 Project Procurement Strategy

Once the team decides on the project life span, including the stages and gates, the project manager can consider the procurement strategy. Some might say it is too early for this topic, but it is not. In some cases, the procurement strategy could have a major impact on the project development effort, hence the need to address procurement strategy at this time in the project life. We stress at this point that the focus is on strategy and not procurement detailed plan, implementing the strategy or selecting vendors and service providers.

2.7.3.3 Value Improving Practices

If applicable, the team would have performed the applicable value improving practices during the development of the basic requirements document. Further, some value-improving practices will take place at this time, with project management planning, yet other practices will be revisited during the next stage.

2.7.4 The 'How To' Questions

1. General sections
- *a. Project life span selection*
- *b. Project procurement strategy*
- *c. Value improving practices*

2. Project definition (how to define)
- *a. Scope, time and cost*
- *b. Quality, safety, & environmental*
- *c. Human resources & communication*
- *d. Risk & procurement*
- *e. Other considerations*

3. Project management & control
- *a. Managing and directing the work*
- *b. Performance management*
- *c. Project change management*

4. Project operation readiness
- *a. Preparing for handover*
- *b. Preparing for initial operations*
- *c. Preparing for permanent operations*

5. Project closure
- *a. Project reconciliation*
- *b. Lessons learned*
- *c. Project close out report*
- *d. Project success measurement*

Figure 12: Sample Project Management and Control Plan

2.7.4.1 How to Define the Project

Project definition is the focus of the next stage where the detailed planning for the project takes place, which provide the final project detailed plan.

Notice that we are using the term 'how to define' and not 'define'. What is the significance of these words? In the 'how to', one is only answering the how[30]! For example, "*we will need to survey our customers*"; "*we will hire a specialized landscape architect to design our garden*." On the other hand, 'define' is the actual design of the garden; the design of the survey.

The question we raise here – how to define – is a simplified version, which represents many more questions. For example, *how to define the scope of the project; how to develop the schedule; how to manage risks; how to ensure proper human resources and communication planning; and how to define the requirements to meet the laws and regulations in term of safety, health, and environmental factors*. The only way that we can properly, and accurately, define the project is by answering all of these questions and others that might be more industry (domain) specific.

Remember: At this time, we are answering the 'how to'; we are not providing the detailed answers; yet![31]

2.7.4.2 How to Manage the Project

The following are required topics to answer 'how to manage the project'.

1. Human resources for project management:

    a) What would be the number of team members; required for the various project components?
    b) Do we have the required expertise or competence for the specified work?
    c) How involved would senior management want to be?

    Once we define the team requirements in response to the above questions, then we can finalize the project organization chart and/or directory. It would also be highly recommended establishing the staffing plan, with dates of arrival and departure of resources. More important than dates would be criteria for mobilizing or release of resources. An excellent tool for working teams is the Responsibility Assignment Matrix (RAM).

2. Project management communication: we need people to manage projects, projects have an impact on people, and everyone has a need to receive or pass information. The project management plan is the tool that we will use to help establish the right mechanism for effective communication. We start with identifying the communication requirement for the project various stakeholders. The project team must be careful to address the needs from non-team members, the other stakeholders.
3. The project management other functions: the word function here represents the various functions[32] of project management such as scope, cost, safety, quality, risk. Similar to human resources and communications, we can ask similar questions specific to how to manage scope – cost – time – quality… For example, we ask how to manage risk, but performing a risk assessment, for the project, is what we do with the detailed planning.

2.7.4.3 How to Control the Project

How to monitor project performance?

How to ensure proper project control?

What is project control?

Project control is about the various actions that the project management team takes to keep the project on track, or as close as possible to the original plan. The main objective is to ensure completion of the project within the established parameters, or, once again, as close as possible. These actions can include any corrective actions in case of variance; this is passive action. They can be preventive actions to prevent a potential variance; this is proactive action. Further, the action could be rework to fix a quality variance, such as a defect.

When we use the term project control, there are two essential components that we need to consider.

- The first element is project control, which would encompass, cost control, scope control, time (schedule) control, among the other project management functions. A better term to use is *Performance Management*. *Performance Management* is a direct indicator of project performance, which we check or measure by **comparison to the plan**.

- The second essential control component is specific to *project change management*. *Project Change Management* is specific to any proposed or approved changes from the plan[33]. Some of the questions that the project management team will address here are:

  i) What are the control procedures that will establish for the project?
  ii) Will we have strict control or not? Keep in mind that strict control could lead to bureaucracy where the team could become the 'slave' for the control system rather than the control system facilitating performance. This is crucial for small projects. In all cases, the team needs to have the proper balance.
  iii) For change management, will this be limited to project contracts only? Alternatively, will the organization wants to manage internal change, formally?
  iv) A value improving practice related to change management is the concept of zero change. Can management agree not to entertain any changes to a project, once they approve the project detailed plan, unless there is a safety or serious issue at stake? This is very difficult but not impossible.

2.7.4.4 How to Get Ready For Operation

First, let us define what we mean by operation.

Operation is the term we use to refer to permanent operation 'of the product of the project', which is the responsibility of the end users, the client, internal or external. For example, if we are building a refinery, once construction work is complete, the project team will hand over the facility to the refinery management who will be responsible for the operation and maintenance of the refinery. For an IT infrastructure project for a facility, once the physical work is complete, the team will turn it over to the client who will run the new hardware; in other words, operate and maintain the new system.

Therefore, we use the term 'operation', to refer to operation and maintenance, after the project is completed and handed over to the end users. In this context, CAM^{2}P™ uses the term operation readiness to represent any work that is necessary so the client can operate, manage, and maintain the product of the project. As the name indicates, it is about all of the activities that the team must accomplish in advance of project completion, and pre-handover.

How do we get ready for operation?

Typically, end users, operation's personnel perform any work related to getting ready for operation with the support of the project manager and team. The main consideration at this stage is to decide on how we will perform this work. During the project implementation stage, the project sponsor should form an 'end users team'. This team would establish the necessary procedures, guidelines, training, and all what is necessary, to get ready for operation[34].

In the previous paragraph, we said that the sponsor mobilize the team during project implementation. This is not always true since on certain projects, especially organizational change projects, the sponsor could form this team from the time the organization authorize the project. This earlier mobilization is necessary due to the complexity of organizational change and the possible resistance to these projects.

2.7.4.5 How to Close the Project

As the project moves into the implementation stage and progress toward completion, a great deal of work need to start happening to deliver the project to the client (internal or external) and the team must also start planning for project close.

Importance of Proper Project Closure

Some organizations do not put effort into project close, and they view it as one of the least important project activities. There is no glory after the work is complete. However, taking a strategic perspective, as we present in this Series, the project work is not complete until the project is formally closed.

This is very important, and we must have this mindset ingrained into the organizational culture if we were to increase the organization's project management maturity. To emphasize this point, first CAM^{2}P™ have a dedicated stage for project closure, and second we place the project close stage as part of the project delivery phase, instead of having it as a separate phase after delivery.

Why is it so important that we do close project properly?

Well for once, if we do not do it properly, a great deal of history and project performance data is lost, which would result in no organizational records, to help plan future projects. No memory, no lessons learned, then we are doomed to repeat our history, which might not be great. Further, when we estimate projects, especially in the earlier stages, how do we know how to estimate if we do not have prior records?

Since there is no glory in closure, we want to ensure that the project team members do not disappear after handover and the project management plan must include considerations for the procedures and staff that would be entrusted with the close out.

2.7.5 Other Project Management Plan Sections

The project management plan is likely to include other topics, such as financial requirements, sustainable energy consideration, volunteers' management, or other relevant topics, which would be a function of the project domain.

2.8 Updated Estimate – Time and Cost

During the development of the project management plan, the project manager is likely to develop an updated time and cost estimates based on the new information that the team generated and defined since the feasibility study. You may have noticed that, during the feasibility study, it was the first time that we had any discussion of the project cost and time, but we only have rough estimates at the time, order of magnitude, due to the limited information. With the basic requirements and project management planning work behind us, this would be a great time to update the estimates and submit with the project management plan to management at SG4.

One common name for the estimate the PMT develop at this time is 'budgetary estimate' and is more accurate than the estimate used in the feasibility study but still not accurate enough for detailed control[35].

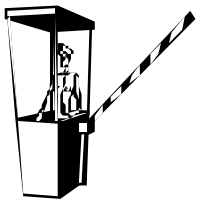
2.9 Once Again – Process Groups

Many of the points in this chapter might resemble the planning process group of the PMBOK® Guide. Therefore, we revisit this subject at the risk of being too repetitive.

Process groups are not stages of the project life span!

1. The project management plan that we discussed here is for the project – the full project – and not any stage, or phase. *In the PMBOK® Guide, the project management plan might be for a phase or the project.*
2. Further, the PMBOK® Guide has one plan – project management plan – whereas CAM²P™ has a project management plan and a project detailed plan. In other words, the PMBOK® skips the 'how to' and go straight into the 'define', or at least combine the two within the planning process group. Consequently, this CAM²P™ project management plan is not the same as one with the same name in the PMBOK® Guide.[36]

2.10 Stage Gate 4 (SG4): Approval of Project Management Plan



As a refresher, SG1 was about determining if the project is in alignment with the organization strategic plan and objectives. If it were, then the organization considers the project for further evaluation and performs a feasibility study.

SG2 was about verifying that the project is viable (feasible) and if management decides to proceed and authorize the project. Here, we must remind the reader that a project could be viable yet management could still decide not to proceed since other projects might be of higher priority. This later statement deals with the concept of portfolio management, which is outside the scope of this Series.

In this stage, SG3 purpose is on ensuring alignment among the various stakeholders on the project requirements.

Finally, at SG4, the main concern is for executive management to review the project management plan and to determine if this plan would lead to the effective delivery of the project in line with the objectives that management has outlined earlier. Furthermore, the management will review the updated cost and time estimates to determine if the project is still viable and still expects to realize the benefits.

2.11 Stage Summary

This is the second stage on the project life span of the CAM²P™ Model and part of the project development phase. In this phase, the organization develops the project concept to help ensure effective delivery. We split the development phase into two stages since this would allow us to exercise better control on the output and outcome.

The focus for the stage is to identify the key project requirements and develop the project management plan. Without proper requirements, especially requirements that we derive from exploring the clients' needs and expectations, then there is a high chance that project management plan and project detailed plan would not reflect the organization's vision and aspirations. With a poor plan, the chance of project success would reduce significantly if not totally lost.

Final note, in some organizations, or for small/simple projects, management might believe that it would be satisfactory to combine this work (BRD and PM Plan) into one deliverable and one gate. Whereas others might find a need to split this stage into two stages, BRD stage, and project management planning stage. If this happens, we are likely to have a high degree of overlap.

3 Project Definition Stage

3.1 The Stage Overview

The third stage on the project life span of CAM²P™ is the project definition stage[37], which is also part of project development phase. We recognize that the word 'definition' means different things for different people and we need to address this point.

Some professionals think that project definition is the description of the project statement of work. In CAM²P™, the statement of work is what we label as 'idea statement'.

Other professionals think of project definition as the basic scope, which is what we discussed as being the basic requirements document in CAM²P™.

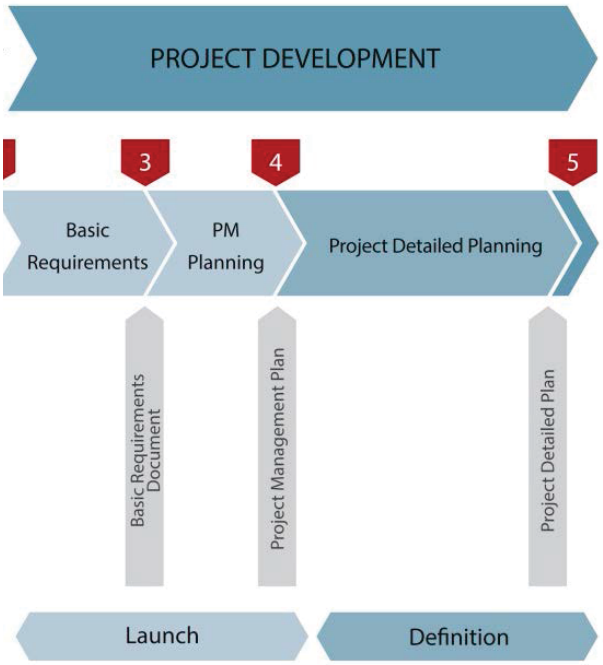


Figure 13: Project Definition Stage (Part of Project Development Phase)

Yet, others think of it as the project scope statement, which is close to what we have here but not totally in line.

So what is project definition all about?

It is about the answers to the 'how to' essential questions that we listed in the previous chapter. It is about developing the project detailed plan.

The project detailed plan is about providing the scope definition; scope details. It will also include the detailed quality, safety, environmental planning details. The detailed time and cost estimates are part of the final package. In addition, we include the details for all of the other project management functions.

In summary, it is all of the details the team needs to deliver the product and complete the project. It is what we need to do (scope) along with how much it will cost (cost), how long it will take (schedule), what quality standards apply and need to measure (quality)…and all other functions.

The time span of the stage is from approval of the project management plan to final project approval.

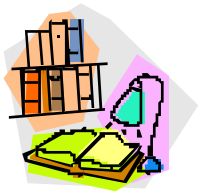
The major stage deliverable is primarily the project detailed plan. In some cases, a project funding (or approval) request is another key deliverable if the organizational system requires this to be a separate package from the project detailed plan.

There is only one gate, SG5, which is specific to the review of the project detailed plan, and if all is well approving the plan, and grant the final go/no-go decision.

One final note here for PMP® certification holders – the project detailed plan resembles the project plan of the PMBOK® Guide, in term of the processes, but remember that in this Series we are talking about the detailed plan for the project and not a phase.

3.2 The Sequence of Events

The main sequence in this stage will be per the following:



1. The project manager and the team will start this phase by reviewing the essential documents that are already at hand, such as the project authorization document, basic requirements document, and project management plan.
2. In certain industries, most of the work of this stage is likely to be outsourced to a specialized service provider. Such as an architectural firm for the architectural design or a technology company for an industrial facility.

   If outsourced, then the PMT will follow the procurement strategy, established with the project management plan.

   If the work will be in-house, then the project manager will need to assemble the project team[38] to perform the project 'technical' and 'functional' work for the detailed plan. At this time, more project management personnel will be required to join the team since the workload is increasing, in comparison to earlier stages.

3. The project team, whether internal or external, will develop the project detailed plan.
4. When the project detailed plan is near completion, the project management team will also be working on the project funding (final approval) request. We represent this work by the narrow chevron between the PDP and stage gate 5.
5. Stage gate five (SG5): this gate is about the final approval of the project.
   It is important to note that the cost of the work that the team perform before this point, from idea statement to SG5, is minimal in comparison to the total project cost. On the other hands, the implementation stage is where most of effort and associated costs will take place. Therefore, on most projects we consider this gate as the point of no return. Once management grant the approval, it is likely that the project will proceed to completion.

3.3 Mapping the Process Groups

Once again, we map the PMBOK® Guide process groups to this stage.

1. Initiating this stage is at the gate approval, SG4.
2. The project manager and the team will put the plan for the stage.
   On projects in the capital-intensive industries (facilities), this stage can be substantial and requires a great deal of effort and money. If we will have external provider to perform the technical work, the project manager will put the management plan for the stage and procure the services of the service provider.

   If we have a service provider, the service provider should complete the stage detailed plan for their work.
3. With the plan, for the stage, in place, whether by the internal resources or the service provider, we move ahead with executing the stage work, which is developing the **project** detailed plan.
4. Monitoring and controlling would be happening throughout the stage. At this stage, the control is starting to become easier than before since the control is against the project management plan, which has more details than the PAD, although we still closer to qualitative rather than quantitative control[39].
5. Finally, closing this stage would happen after we have final approval.

3.4 Project Plan(s)

3.4.1 Reinforcing the Concept

We can anticipate that by the time the reader reaches this section; there could still be confusion about the project management plan and the project detailed plan. Although we touched on this topic in the previous chapter, we believe it is necessary re-address it here and elaborate on this viewpoint.

We see the necessity of repetition since some of the readers might come from a background that they do not see the difference between the two.

3.4.2 Starting With Two Plans

This matter might be confusing for some practitioners because we are **not** restricting the CAM²P™ model to the PMBOK® Guide[40] and we do deviate from the Guide in certain situations. Therefore, if you are a Project Management Professional or someone who is familiar with the PMBOK® Guide, you might think that there is only one plan since the guide discusses one plan. Then, why we include two plans in the model?

Project Management Plan vs. Project Detailed Plan

Think about Project Management Plan as a vision of the journey to the end; a general sense of direction.

Think about the Project Detailed Plan as a detailed road map; inclusive of the stops, budget, risk, etc.

On some small/simple projects, we could combine these two plans, and that might be an acceptable practice. However, we do see a distinct difference and a need for two separate plans, each with a different focus, and this is why we separate them. *Refer to Figure 14.*

3.4.3 Numerous Plans

The PMBOK® Guide describes the plan as an output of the planning process group. In turn, the planning processes repeat in each stage. Therefore, projects could have numerous plans, and planning is a continuous effort, throughout the project.

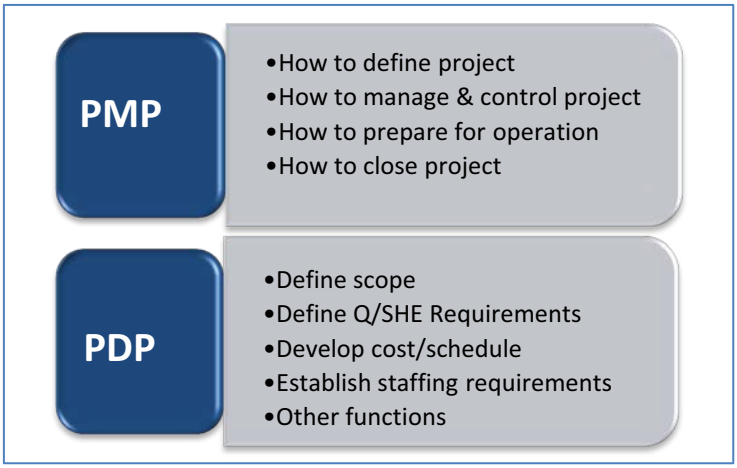


Figure 14: Project Management Plan vs. Project Detailed Plan

What are we presenting?

- The PMBOK® Guide states that the project plan is the plan ***for the stage* or *the project*.** Therefore, the outlines of the stage and project plans are similar, the processes are almost identical, but the focus and level of details are different.
- The project perspective: for the overall project, there are two plans, the project management plan, and the project detailed plan; as we have been discussing in this Series, especially Part I, Chapter 8.
- The stage perspective: in addition, we need to consider the stage perspective and that lead us to a plan for every stage, which would focus on the stage work only!

In the pyramid image, Figure 15, the PM Strategy, at the top of the pyramid, represents the early project management considerations that the project manager would address during the project launch stage or even during the feasibility study, pre-launch stage.

From the project management strategy, the project manager will develop the project management plan, during the project launch stage.

Next, during the project definition stage, the project manager develops the project detailed plan.

The project management plan addresses management and control for the whole project, and the detailed plan provides details of the project, the work the technical team will carry out to accomplish the product. Notice, so far the focus has been on the project perspective.

Finally, the stage plans would be the detailed plans for each stage.

3.4.4 Elaborated or Unique Plans

These plans are **not** elaborations of the project detailed plans since the stage plans for the project pre-launch stage, project launch stage, and project definition stage would be completed before the project detailed plan. Further, each stage is unique, requires different level of effort, and likely to have its own resources, some or most of them would work on the given stage only; not the other stages.

However, these plans could be elaborations from the project management strategy, which is completed early in the project.

3.4.5 More Plans

Well if the stage has more than one provider than each provider will have its own plan and planning will continue cascading down the hierarchy.

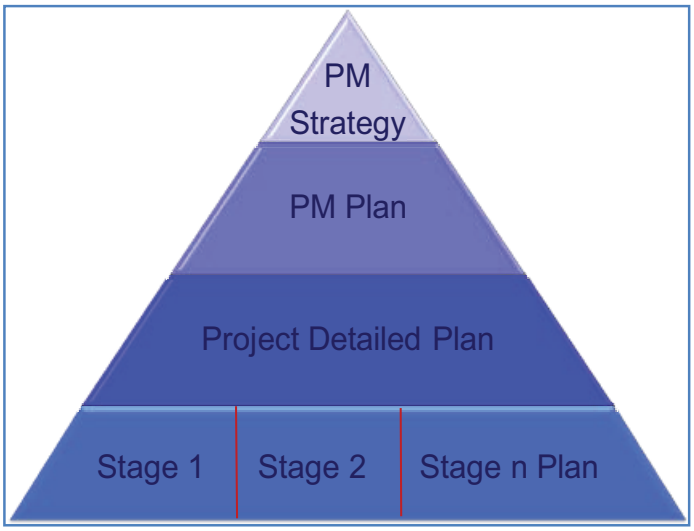


Figure 15: Hierarchy of Project Plans

3.4.6 Special Message

We do recognize the potential controversy here, especially among readers whose experience might have been limited to small projects or only phases of a project. These practitioners would find it difficult to visualize what we present here, and we expect them to question what we suggest; this is a difficult subject to cover. However, what we ask is for a mindset open to possibilities. In other words, if one has not experienced what we describe here – do not just rule it out or judge it. We are not asking you to "trust us" but we ask you to visualize if you were to work on a project from start to finish, especially large and complex projects. We also ask the reader, to explore this topic further, ask those from different business sectors. At the end, we realize that one-size-does-not-fit-all.

3.5 The Project Detailed Plan

As mentioned earlier, the project detailed plan includes the detailed definition. It consists of the scope of work of the project, along with all of the necessary details that would allow the organization to achieve the product and project objectives. It is the main document, which the team will utilize, and regularly refer to, during the project implementation and operation readiness stages. The PDP will include the details for the various applicable project management functions.

Where do we start?

In the project management plan, we listed a few essential questions and the first question was 'how to define the project'. In reality, we would repeat that question many times during the development of the project management plan; each time with a different focus, such as a focus on one of the project management functions. For example, the first variation of the question is 'How to define the scope of the project.' We always start with project scope since it is the foundation for all other functions.

3.5.1 Project Scope

3.5.1.1 Understanding the Term Scope

In the project management plan, we ask "how to define the scope?"

The possible answers would have been "*we will hire a consultant*", "*we can do it internally with our team*", "*we need the help of other departments*" and there could be other options. The most generic answer is, an individual, group, internal or external, will define the scope. In other words, with the project management plan, we decided the 'how to', and it is now the time to perform the detailed planning leading to developing the project scope of work.

In that regard, the scope definition starts with understanding the output or objective of the project, whether it is a physical product, result, or service[41]. Understanding the product and defining its characteristics was part of the basic requirements document. Now, it is for the project team to act on their understandings, and develop the detailed scope statement.

The PMI PMBOK® Guide states that, in the project context, scope maybe:

- Product scope is the features and functions that characterize a product, service, or result.
- Project scope is the work that we need to accomplish to deliver the product, service, or result and with the specified features and functions.

CAM²P™ subscribes to the PMBOK® Guide approach and view the project scope of work as all of the 'physical work' that the team must carry out to deliver a lasting outcome. In other words, scope means 'what must be done'!

An example: to build a house, the scope, *the deliverable at the end,* is the house per the specified features. The question of time, cost, risk, quality are all project management factors that are essential to deliver the project and do have an impact on the product, but *they are not part of the scope*.

One might say the scope is to *deliver a house within budget and on time*. That is not scope; once again, ***scope is the house – only the house***. Time and cost are requirements, constraints, related to delivering the scope but are NOT scope. These are part of the processes of delivering the product. This is very important to understand since there are too many definitions for the word 'scope'. Once again, in CAM²P™, we limit the definition of scope to what we will deliver at the end – the output!

3.5.1.2 Defining the Scope of Work

We believe that the best approach is to start with the basic requirements document and the initial, high-level, WBS. From those two references, the project team starts to expand the WBS into the level of details that are necessary to implement and control the project. The ultimate output is the project detailed scope of work, or some might prefer the term, project scope statement.

3.5.1.3 Scope or WBS, Which to Complete First

We are sure a few readers might be saying now "*what is wrong with you, we do the scope statement first*." Well it is the chicken and egg syndrome, which comes first, the WBS or scope write-up? It is up to you, but we think it is more efficient to start drawing the WBS. Notice we said *drawing the WBS* and not *enter activities on a spreadsheet or a scheduling tool*. The key is to think and draw a mental picture; a mind map, on how you are going to work on the project, how would you logically breakdown the work and common sense will guide you. Actually, a mind mapping software or a WBS software are great tools to use for drawing the WBS but what is important is the logical breakdown. Using a tool, you can readily demote or promote[42] an element on the WBS.

Why do we need a WBS?

A WBS helps us break the project down into work elements (pieces), which will enable us to better plan and control the project.

How big are the pieces?

It is up to you, which can also be a function of your own planning and control requirements.

There are various 'rules of thumbs' that one can use, which might be specific to an application area.

If one follows the above approach, drawing the WBS first, then indirectly you would have created the outline for your scope statement. From a mind mapping software, one can export the WBS to word-processing software, and it is time to start writing and expanding on the details.

3.5.1.4 WBS or Project Breakdown Structure

One common question that we get from clients is "*should the WBS include the project management deliverables or a project management branch?*"

We say, a WBS is about ***work*** – we defined ***work*** earlier as what is the physical work, the tangible output, which we must deliver, not the process to achieve it. In accordance with this definition, the WBS does not include management activities.

A CAM²P™ principle is to avoid rigidity without sacrificing proper practices. Therefore, if you wish to include management activities as a way of your practice, that is fine, we do that sometime. However, when we do include non-scope items on the WBS, we call it the project breakdown structure (PBS) and not WBS. It is up to you!

Long time ago, I was working on a project in Singapore, and since my wife and I love to travel, we decided to spend a week in India. Not comfortable about driving, we had pre-arranged for a car with a driver that was with us for the duration.

Everywhere we went, it was obvious that we wanted to buy some souvenirs and we had our tourist book advising us where to go and buy. We often asked our driver/guide. He always responded with long explanation, most of it not clear due to our language barrier but at the end there were always the phrase "you decy". It took us a while to understand that what he meant is "you decide". In his mind, he gave us options, usually his "friends' store" vs. what is in our book. How did we discover what "you decy" means? Once he was insisting on a specific store. Our book was saying something else. He gave his long speech and kept saying you decy. Finally, I had to ask what you mean. He pointed to one store and to the other and said you decy and we finally figured it out☺!

The funny thing was, when we decy – he will go on for another 5 minutes pushing his "friend" store. We insist – you decy – we decy – another speech!

It has been 18 years but it is still a common internal joke in my family.

3.5.1.5 You Decy![43]

Notice that in various parts of this book, we are leaving you the choice on what to do, but we are doing this when the choice does not sacrifice the main principles.

Where we believe you should follow something, or an item is essential to the model and effective project management, we say so and insist on it. The stages and gates are essential, and we insist on them. However, if an item is not essential, like the number of gates or the name of a stage than we leave it up to you.

The bottom line: what is important is the 'disciplined approach'. Therefore, once you define your approach, follow it!

3.5.2 Q/SHE: Quality, Safety, Health, and Environmental Planning

Once again, we go back to narrowing down the question of 'how to define the project' and add a variation on this question and ask 'how to define the quality, safety, health, and environmental requirements for the project?' We combine these topics (Q/SHE) since from project management processes' perspective they are quite similar.

How they are similar?

1. The team must define the standards and/or regulations that are applicable for the specific project or project domain.
2. Establish the necessary plans that will guide the team toward ensuring compliance.
3. Q/SHE considerations are all highly linked to the organizational culture and management *stand* on the importance of these factors.
4. The team cannot limit their concern to 'the work' during the delivery phase. Rather, it is essential that the project management team make sure that once the facility is operating it is delivering a quality product that would operate in a safe manner with attention to the health of the employees and community, and it is environmentally acceptable.

5. Similarly, Q/SHE considerations shall focus on the management process and the project team, to ensure working in a quality, safe, healthy, and environmentally conscious way.

The above topics vary in importance greatly from one industry, project domain, to another. For example, in the petroleum, real estate development, power, and similar construction related industries, Q/SHE considerations are crucial to the success of the project. On the other hand, for internal business projects some of these functions might not be applicable. Further, there are standards, laws, and regulations that deal with Q/SHE and the project team must be fully aware of those laws and regulations and must adhere to them.

One of the most difficult tasks that I had to perform as a young engineer, on a project, was to determine the "cost of safety".

I was working as the project control engineer on a mega project and a senior manager wanted to know how much are we spending on safety related activities and was that amount justified. My manager delegated that task to me and with research and my manager guidance; I was able to deliver it. The money was absolutely justified but was it enough or too much? I am not sure if anyone can answer this question objectively.

Although I have been fortunate that when I worked on construction projects, like the one mentioned above, I was working for a highly conscious and safety-minded company. In the construction industry, it is common to have many fatalities on mega projects. Despite our safety conscious culture and the money we were spending, we still had a few tragic accidents with the worst two: a worker lost his legs and another lost his life.

Even with these incidents, our records, as compared to global industry average was "excellent," per global standard. Unfortunately, not all companies subscribe to high Q/SHE principles.

3.5.3 Develop Project Schedule

What is next? The project management team develops the detailed schedule.

3.5.3.1 Schedule versus Plan

We hope we do not insult anyone here: the schedule is NOT the plan and a bar chart is not a schedule.

The schedule is the logical relationship among the various activities represented through a network diagram, which is the representation of the project activities and their logical sequence. The schedule development also includes various analysis and techniques to finalize the proper project schedule.

A bar chart, on the other hand, is a time-based representation of the schedule.

3.5.3.2 The Schedule Development Steps

The process to establish the schedule is simple and consists of a few steps:

1. The first step is to start with the work breakdown structure and specifically the work packages[44]. Team members can break down the work packages[45] into further time-dependent steps, which we call activities.
2. With the activities defined, the team links them to each other based on certain logical relationships; sequencing the activities. The output of this process is a project network diagram.

3. Next, team defines the resource requirements and durations of each project activity, these are interlinked, and a change in one variable will alter the other.
4. With activities defined, sequence determined, and resources and resulting duration established, we obtain the 'raw schedule'. The 'raw schedule' is a basic schedule before we perform the critical path analysis and the necessary optimizations steps that follows.

5. The next step is to perform the critical path analysis, which will produce the critical path, the overall project duration, and the floats on the non-critical activities.

What is left?

Based on the organizational requirements, the team might have to perform various schedule optimization techniques before completing the schedule as the official baseline.

3.5.3.3 Schedule Optimization

What are some of these optimization techniques and why are they required?

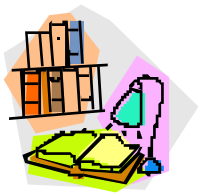
1. Resource leveling: which might be required for two reasons:
    a) If there are periods of unacceptable resources peaks, and low resource usage. This issue can create a high level of inefficiencies due to resources' fluctuations that may not be practical or optimized.
    b) If the number of resources is limited or is a constraint. This would be in term of expertise or availability.
2. Schedule compression: there might be business needs to have the project complete in duration shorter than the team determined. In that case, the team needs to determine options to shorten the project time span. This is likely to increase cost and risk.

3. Reserve time: If there are schedule related risks, or threats to be more specific, then we might need to add reserve time.
4. It is common that the team need to apply all three techniques, and balance them since they often lead to conflicting results. Resource leveling and reserve time increase project duration, whereas schedule compression reduce the duration but increase risks. This why time planning and scheduling required many iterations and would still have potential gaps and pitfalls.

3.5.4 Cost Estimating

Cost estimating is one area where we often oversimplify or misunderstand, even on major projects. Estimating also varies from one industry to another with some industries or organizations performing one estimate during the project life span whereas others might have as many as three or more estimates.[46] In this chapter, we will highlight the key principles.

3.5.4.1 How to Develop Proper Estimates



As we said earlier, this is not a book to detail all project management functions so we will not bore you with top down, bottom up, parametric, ratio, and index estimating[47]. We will only focus on the basics, and once you know how to do the basics, there are many resources that help you go to the next level.

Sometime back, I was leading a cost estimating team for a mega petrochemical project. Management was insisting that we do our best to be stringent in our effort and not to include extra allowances; no extra costs. Actually, they instructed us to have a 'lean' estimate.

Since this was a mega project, the cost (early 1990's) was close to a billion United States dollars. In such a project, there are numerous 'gadgets', like electrical bulks, pipes, pumps, instruments, control system, and other items.

One team member felt that management was pushing us not to be 'lean' but 'too lean' and he wanted to do something about it. In the details of the section that he was estimating, there was an expensive gadget and we needed 10 units. In the estimate, he put 20. Now on a mega project, as we review the estimate it is not easy to see what he hid in the details but those extra ten items meant approximately 1 million dollar. As I was reviewing his work, I caught this discrepancy and we removed the extra cost.

A few months later, we were in the engineering office working on allocating out approved budget into control accounts (time phased budget), so we had to go into the details. I noticed that my colleague had done similar thing in another area.

He was persistent and he gave us an extra million dollar☺. On a project of that size, a million is lost in the round-off. That project was complete below budget!

In project management, this is what we call fat, padding, or extra cost and we consider that as unacceptable behavior, and we cannot allow it. Yet, as this story shows, it is easy to hide extra costs (or time allowance) in an estimate.

If you know your business, and have been in business for a while, you should have records from similar past projects. If you did not maintain records, then design a simple spreadsheet and start saving your project information for the things that you normally do repeatedly. For example, if you are in the restaurant business, you must know the price of chicken, tomato, eggplant, and other ingredients so you can estimate how much a meal will cost you in order to decide on how much you should sell it.

Whatever your business is, starting to build a database is as easy as a note pad and a pencil or basic computer. Once you built the database over time, then it is relatively easy to estimate; estimating would be counting widgets and multiple the numbers by cost per widget.[48]

If you do not have the database, then your choices would be guesswork, call over optimistic vendors and service providers for quotations, or to ask someone else, who might not be accountable, to get your cost figured out. Neither of these choices will help in developing good cost estimates.

For proper estimating, a WBS is a great tool to use. A WBS provides details of the project scope and work packages, which would allow easier estimating and more accurate estimates.

3.5.4.2 Importance of Proper Estimate

A special note here, without proper cost estimate, and a realistic schedule, you might be starting your implementation along with riding on the 'cycle of doom'. It is as if you are driving with the wrong map. With the wrong map, the chance of getting lost is high, then, you waste time trying to discover where you are and how to get back on the right road. At the end – you lose time, money, in addition to, frustrations and potential conflict among the stakeholders.

3.5.5 Human Resources Requirements

Human resources' planning is about planning the human resources for the project.

In the project management plan, we did address most of the items related to the human resources requirements to manage the project. Once again, the WBS could be a great starting point to help us expand on the project management plan and define the various people requirements for the various project components.

On some projects, it is likely that we will outsource some, if not most, of the project delivery work, and the service provider might perform the detailed HR planning.

3.5.6 Communication Plan

Similar to the human resource requirements, most of the general project communication requirement, we included in the project management plan. For detailed communication planning, we would elaborate the project management plan, and address the stage specifics requirements. It is possible that a significant number of stakeholders would come on board or depart with each project stage, especially on a major project.

3.5.7 Risk Management

3.5.7.1 Risks: Threats or Threats and Opportunities

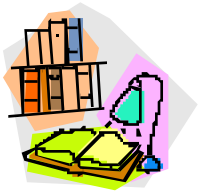
There are two schools of thought on risk; one considers risks as threats to the project. As a result, this school of thought uses the terms risks and opportunities with risks being the bad stuff and opportunities as the good stuff. Whereas the other school of thought, considers risks as threats or opportunities; meaning the risk could be positive or negative.

In this work, we subscribe to the latter school of thoughts; which is risk could be a threat or an opportunity and risk management is about managing the risks by minimizing the threats and maximizing the opportunities.

3.5.7.2 Risk Management across the Project Life Span

From our practice, we recognize that risk management is still an emerging practice, lagging behind project management as a general discipline. Not many organizations perform proper risk management on projects. Those who do some form of risk management on projects might do so partially. Meaning, they either consider threats only and not threats and opportunities. Further, they might perform a risk assessment during a phase but not in every phase[49].

3.5.7.3 Risk Assessment



How to identify and assess risks?

How to respond or treat risks?

This is a lengthy discussion. Here, we refer the readers to literature on project risk management. If the readers prefer standards, there is the PMBOK® Guide, the Practice Standard for Project Risk Management also from PMI, and ISO 31000, which is a standard for organizational risk management and cover project risks like any other business or organization risk.

3.5.8 Project Procurement

The project management plan addresses the general procurement strategy for the project. More detailed procurement matters, usually for the potentially major contracts that will be required for project implementation, are part of the project definition. However, we must stress that the procurement processes are required every time we have a need to procure something – a service or hardware.

Some procurement activities could have taken place as early as the feasibility study, and we have mentioned this almost in every stage – in the prior chapters. On some projects, most of the earlier processes and work the organization can perform with internal resources. Therefore, procurement might not have been a consideration.

On the other hand, as we approach implementation, the vast majority of projects will require implementation by service providers.

In preparing our procurement approach, what are the key questions?

1. What work should we outsource?
2. What is the most suitable type of contract for our project and objectives?
3. Is it better to choose with one or multiple providers?
4. Do we need the assistance of a specialized project management company to help us manage the project?

5. How would we tender the project or segments of it, through advertisement, pre-selected providers/vendors list, or other mechanism?
6. Are we going straight into tendering or will we have a screening step through expression of interests first?
7. Who would be preparing the procurement documents?
8. Do we need legal expertise and where do we get it?
9. What contracting standard would we follow?

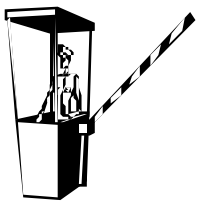
3.5.9 Other Consideration For the Project Detailed Plan

Are there any special considerations or items to address in the project detailed plan? This might be a function of the domain or type of project. Since we cannot cover all possibilities, you have the responsibility to think about your own circumstances.

3.6 Request for Final Approval

The project detailed plan includes the project schedule and cost estimate, along with the details of the other project management functions. In most industries, the cost of the work for the earlier stages, prior to stage gate five (SG5), is small in comparison to the overall project cost. However, after SG5 the team will move into implementation where we require most of project funds and effort. Therefore, SG5 is crucial, might require special attention, and a request for funds at final approval. In certain industries, this deliverable might be the responsibility of the sponsor, who would complete the request for final approval with information from the project detailed plan.

3.7 Stage Gate Five (SG5): Final Approval



We title stage gate five (SG5) as the final approval since in most industries once we have a detailed project plan, inclusive of scope, time, cost, Q/SHE, and all the other factors that we have already addressed, then management have enough information to make this final decision. The reason we use the word 'final' here is that the chance of cancelling the project after this point is almost nil. Please note, organizations have cancelled projects after this point but rarely, at least on capital-intensive projects.

What are the important points to mention at SG5?

1. Since this is the final decision, approval means the official funding or financing for the project.
2. For many project, the decision is by management. For major projects, the decision is likely required at higher levels, such as the board of directors or the shareholders of the organization, if commercial entity, or highest level of government for public sector projects.

3.8 Stage Summary

This is the third stage on the project life span of **CAM²P™** and part of the project development phase.

The focus for the stage is to perform detailed planning and complete the project detailed plan. The project detailed plan consists of the scope statement, detailed schedule and cost estimate, quality, safety, health, and environment plans, risk management plan and risk response plan, among other components.

With this stage, the team also prepares the request for the project final approval since this is the point of no return on the project, which would be at stage gate five (SG5).

This is a crucial stage for the success of project delivery. If the project detailed plan is deficient, then we are likely to have negative consequences during implementation or operations.

One final note, the following is a function of project class or environment. The time required to perform the project work, from idea statement until stage gate 5, might be about half the time from idea statement to project closure; if not more. Whereas the cost is approximately 3 to 5% of the total project cost, maybe up to 10% in special cases. In other words, the scale of activities after stage gate 5 will overshadow and dwarf the level of effort that has taking place so far.

Section 3:
Project Delivery Phase

4 Project Implementation Stage

4.1 The Stage Overview

The project delivery phase consists of three stages; these are project implementation stage, project operation readiness stage, and project close stage.

The first stage in this phase, which is also the fourth stage of **The CAM²P™ Model,** is the project implementation stage. This stage is usually the most involved stage in term of effort, time, and cost.

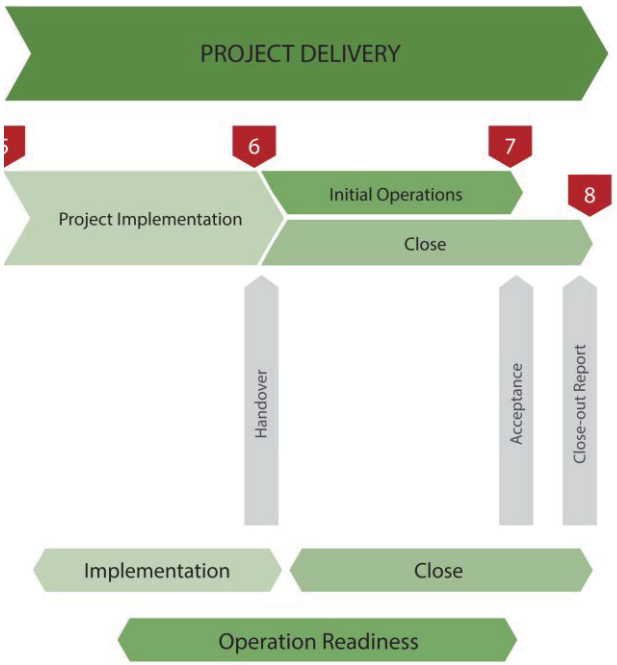


Figure 16: Project Implementation Stage (Part of the Project Delivery Phase)

The focus of this stage is to implement the project. Implementation is the action of doing the 'work' for the project to complete the required deliverables, leading to handover of the complete product, service, or result, the output.

The time span of the stage is from project final approval, SG5, to handover at SG6. However, in some cases some of the implementation work will stretch into initial operations, and even to SG7, but only in rare cases.

The major stage deliverables are the completed project work packages leading to the final output of the project, which could be a product, a service, or a result[50].

There is only one gate, SG6, with the main concern for this gate is to gain confidence that the team have accomplished the work satisfactorily. To validate the work, the project team and operation personnel have to review the project implementation work and completed deliverables to determine if operation personnel are ready to accept the 'product' from the project management team.

4.2 The Stage Sequence

In real life, the sequence of implementation activities is unique to each industry and project. What we can offer is the sequence from a project management processes' perspective. The general sequence of this stage is simple,

- Perform the work in accordance with the project detailed plan
- Obtain acceptance of the major deliverables from the end users, or client
- Handover the completed project product to the end users.

Depend on the nature of the project it is likely that we could divide the project implementation stage into two or more sub-stages. For example, for an industrial facility or a real estate development project there will be an engineering design sub-stage and a construction sub-stage. In some cases, we could have one provider handling all of the sub-stages, yet in other cases, we could have different service providers for each sub-stage.

4.3 Mapping the Process Groups

As before, we initiate this stage with the gate approval, in this case at SG5.

In projects where service providers will deliver most of the activities of the stage, then the stage gate approval will lead the team to initiate the procurement processes and hire a service provider. In this scenario, contract award will initiate the work of the service provider[51].

With initiation complete, time for planning the stage and develop the stage detailed plan. This detailed planning effort is often the responsibility of the service provider, in situations where there is a provider.

Executing the stage work is obviously doing the work of the implementation stage, which is often the detailed work of the project. In parallel, the team would be monitoring and controlling throughout the stage, which would be a continuation and an essential component of the overall project control. In this case, control is quantitative since we would have quantities or specific deliverables to manage.

Finally, closing this stage would happen with completion of the physical work after the handover. Notice, we are talking about closing the stage and not the project. Closing this stage leads to starting the **project** close stage.

If we split implementation into two or more sub-stages, than the above steps repeat with every sub-stage, for example engineering sub-stage and construction sub-stage.

The rest of this chapter covers various concepts related to project implementation stage, with a focus on management and control[52].

4.4 Implementation and Control

We have already stated that the project implementation stage is the stage that requires most of the effort, time, and cost. Most of the **management** effort in this stage is about managing the day-to-day work to ensure delivery of the project in accordance with the requirements and the original project objectives. To achieve the higher objective, delivering the 'product', we do so by delivering the pieces, which we call work packages.

Further, it is during this stage where the bulk of the project control effort is taking place[53]. In reality, when we use the term 'implementation' we could also refer to it as 'implementation and control', although this would not be 100% accurate. This is similar to what we mentioned during the discussion on developing the project management plan, when we discussed combining the questions of how to manage and control; therefore, manage and control, or implement and control, are tightly integrated.

4.4.1 Performance Management

Performance management is about how to manage the project performance throughout the project, especially at this stage. Some practitioners might prefer the use the term 'performance measurement', which is fine, but we find management is more results' oriented than measurement. To manage performance we need to establish the 'control reference points', or baselines, with a focus on the time-phased budget.

Let us start the explanation by going back to the previous stage. In the project definition stage, we complete the project detailed plan, which includes:

1. The work breakdown structure: the WBS provides the work packages, the scope deliverables. We also have the scope of work details. These items give us the scope baseline.
2. The detailed schedule; showing the activities required to complete these deliverables, along the project timeline. This is the schedule baseline.
3. The cost estimate; which include the cost of these various packages. This is our cost baseline.

In addition to the above, the final approval at SG5 would sanction the WBS, schedule, and cost estimate as the approved and official documents for project implementation. In this scenario, we have three baselines, one for each function. Yet, there is a better way.

The project manager and team can combine the approved WBS, schedule, and estimate and develop the project's performance management baseline (PMB). The PMB is indirectly a blend of the three baselines. The PMB is the project budget that we allocate to the various packages and control accounts, over the project duration. This allocation would help us create what we call control accounts, which we use in Earned Value Management.[54]

> *"The PMB is a time-phased budget plan against which project performance will be measured… The PMB should not include any management or contingency reserves, which are controlled budgets above the PMB."* (Fleming 2005)

The PMB is an essential component for project control; it is our navigation system and an essential component of project management. Without it, we can only think of the analogy: a plane flying without a navigation system, where it lands, would depend on the circumstances.

Figure 17, shows an example of a time-phased budget, the columns; these are the monthly planned values[55]. The figure also shows the performance management baseline, the blue line. The PMB is the cumulative curve for the monthly planned values[56]. In Earned Value Management, this is the Planned Value (PV) curve. Typically, the team can develop this chart from the approved plan.

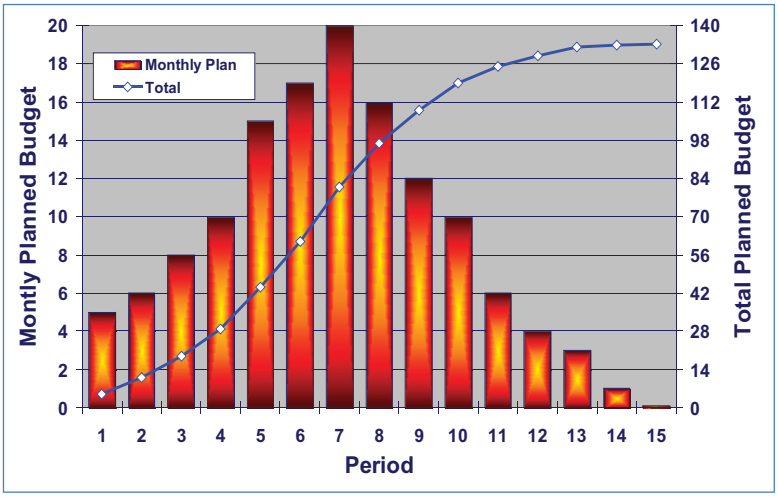


Figure 17: A Sample Time-Phased Budget (Performance Management Baseline)

4.4.2 Start Implementation

The next step is to start the physical implementation for this project. We must stress and re-emphasize that we use the word implementation to represent carrying out the physical work and project deliverables that we defined in the PDP.

OK clear, implementation is doing the work!

Doing the work only?

Yes, and no, control is happening in parallel as we already established.

As we do work, 'supposedly' according to plan, it is known that some 'things' will not go according to plan, and this is why we need humans to manage projects so they can adjust as we move forward while keeping our eyes on the objectives.

Then what are some of the things that happen during the implementation?

It is time for a story!

4.5 The Trip

4.5.1 Idea to Project Detailed Plan

Although we are in the implementation stage, our story will take us back to the very beginning. Let us take a road trip and consider the project as our trip; forgive us for the over simplification, but we know that you will get the concept and will be able to translate it to your own environment. We hope that your trip is not like the Abilene Paradox[57].

Our trip will follow the methodological steps that we have been presenting so far!

Once upon a time – a family wanted to go on a trip…

The idea: take a road trip with family and visit two to three cities (*this is the what*). Purpose: have fun and relax (*this is the why*).

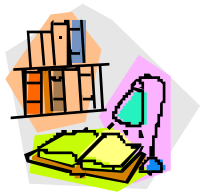
Approval: OK, a trip would be a nice vacation after this Series – smiley – and it is part of our family strategic objectives, which is to explore different parts of the world.

Feasibility: the cost for the road trip to a nearby country is less expensive than flying to a far location and we can afford it (financial). We have a good car to drive (technology). We have a good driver and enough electronics to entertain the kids between cities (people). There is no competition here; sorry forgot about the mobile with interruptions from the office to compete with fun (leave strong instructions not to be disturbed). You got the idea.

Stage gate 2: The higher authorities approve the project; will prepare a PAD.

The PAD: the PAD is brief and includes the objective for the trip, where to go, approximate time and cost… For example, the PAD can possibly include…trip to have fun and relax…will visit three cities in Lebanon…the assumptions is that the weather would be nice…constraints – pack light we are in a car…

Basic requirements: have fun, activities for the whole families including children activities, the cities to see are Tyre, Tripoli, and Beirut[58]…emergency services for vehicle, insurance, accommodations, cash and credit cards … based on the tourist information for these cities we should consider the following attractions…



Project management plan: we expect the plan will include three cities with about five major attractions in each – fifteen attractions. On average, we can see two attractions per day then it would be about eight days trip, say 10 allowing for driving and lazy days. The cost will likely be about $300 per day for accommodations, food, fuel, sightseeing… Quality, mostly related to hotels and that would be apartment hotels since we are a family. Safety, practice safe driving practices. Health, ensure we have the proper clothes for the places being visited and some basic medicines included. Environment, trash bags for the car, so we do not through it out of the window. People/family, two young boys, husband, and wife – most of the work will be by the parents but will assign some actions to the kids. How to define the project…tourist books for the attractions and hotels, maps for driving… How to manage and control…we will monitor expenditures and the maps, but the main objective of this trip is to have fun, so NO strict control.

Approval (SG4): the project is still in line with the original objective and expectations. $3000 overall cost is within the general budget.

Project detailed plan: the plan would include the details for the project, expanding on what we have done already

1. **Scope**: we finalize the cities and define the attractions in each city. We prepared notes on what each city is famous for so we can purchase souvenirs. We marked the map for the road trip, with locations of all attractions.
2. **Quality**: We did define the standard of the hotel and identified the hotels in each city.
3. **Safety**: take emergency triangle for the car in case of break down, check the tires and engine check about the safety of the city visited and what areas not to go into at night, or day for that matter.
4. **Time**: based on the scope we will define how many days we need at each location.
5. **Cost**: with the standard of the hotel defined, we estimate the cost for the hotels, including any tax or service charge. We can also estimate the cost of food and beverage. We can calculate the distances to travel and estimate vehicle related costs. We identify the cost of the attractions.

OK – we think the idea is now clear, with a detailed project plan we would have completed the project definition. It is time for approval from the higher authority of the house.

4.5.2 The Rest of the Story

We have approval – time for implementation.

In this project, the implementation stage could be one stage; or divide into three sub-stages with each city being a sub-stage. It does not really matter in this case, but it may on your project.

Packed and ready to go!

What could happen[59]?

4.5.3 Variances

During the implementation of any project, whether it is a trip or developing a green building, things will happen that would not be in accordance to the plan. We call these variances or deviations from the plan.

What could these variances be?

The car is consuming more or less fuel than expected. Fuel cost along the road is more expensive than our home city. The first attraction was great and the family spent more time than planned there.

In other words, a variance could be cost, time, quality related, people related, or anything else that is different from what we outlined in the project detailed plan.

Some variances could be minor, and you decide that they are ok, no need to do anything about them. However, we could also encounter substantial variances, which we should do something about to maintain a healthy project.

For example, let us say we arrive at the hotel and find that they had raised their price by 30%, which is more than we are willing to accept. We can go to another lower cost hotel, which would resolve this cost variance, but we lose time and some comfort! Alternatively, we can accept to pay the extra cost, with an impact on the project budget. The actions we take to correct a variance we call corrective action.

4.5.4 Avoiding Variances

A project management key principle is about preventive action and being proactive.

A good project manager should look ahead to avoid potential problems or variances. Listening to the traffic report indicates a potential traffic jam then an alternate route might be a consideration. Checking out for information about an attraction to determine the best time of day to go in order to avoid long lines, would reduce lost time, stress, and lead to more enjoyment.

These kinds of actions, the ones we take to avoid a variance, we call preventive actions.

4.5.5 Rework

Rework is usually the result of work that we did not do properly. It is also to repair a defect. This is mostly a quality variance.

For example, if we encounter a problem with the car, we would have to fix.

4.5.6 Changes

We use the word 'change' here to indicate any change[60] to plan.

What plan?

Since we are in implementation than the project detailed plan is the main control reference point. However, a change could be to the project objective as well. In this case, we also measure the change against the project authorization document (PAD).

It is important to note the following:

1. We must differentiate between a change and a variance.
    a) A variance is a deviation from the plan that happens in relation to performing the work; then it is a performance related matter whether under the team control or not. *In our trip project, arriving late to Tyre is a performance related variance.*
    b) On the other hand, a change is a conscious decision to alter the plan. *Deciding to go to Byblos instead of Tyre (a different city)[61] is a change in the plan.*

3. We must also differentiate between a change to the detailed plan and a change to the project objective.

    a) A change to the detailed plan is possible while we can stay within the project objective; we measure this against the project plan. *In the trip, changing which attraction to see first is a change to the plan but remain within the project objective.*
    b) On the other hand, we measure a change to project objective in comparison to the PAD. Such a change is likely to cause a change to the project plan as well. *Deciding to conduct some business while on the trip and visit with clients is a change in the objective.*

4.6 Implementation and Project Management Functions

In the previous sections, we did cover the day-to-day management of a project and the things that do happen along the journey of project delivery. We have discussed a simple project, the trip, from concept to the detailed plan. Then we shifted to implementation and discussed variances and corrective actions; avoiding variances and preventive actions; quality and rework, and closed with a discussion on change.

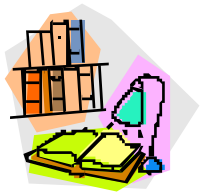
What are the other project management items that are applicable to this stage?

In the next sections, we will discuss *implementation and control* specifically to the various project management functions.

4.6.1 Scope, Time, and Cost

We combine scope, time, and cost because they share a high degree of integration.

Earlier in the chapter, we mentioned the performance management baseline (PMB) that combines these three functions as the foundation for earned value management. It is time to expand on this topic.



Implementation is about carrying out the work of the project, the physical work, leading to the completion of the various required deliverables. We defined work, physical work, what has to be done, as the project scope.

As we do the work, control is in place to validate what items we have done and what we have not completed yet, we are interested in when done, how long it took, at what cost…etc. All these variables are part of earned value management where some simple calculations give us indications about the health of the project.

Through earned value management, we can answer many questions that would be of interest to senior management. Some of the questions, courtesy of the PMI® Practice Standard for Earned Value Management (Project Management Institute 2005), are:

1. When do we expect the project to finish?
2. Would the project be ahead, behind the required date, or within the schedule parameters?
3. How is the project doing now, ahead, or behind schedule, below, or above budget?
4. Are we expecting to complete the project within the budget parameters?

The main advantages of earned value management are:

1. It combines scope (work), with time (schedule), and budget (cost).
2. It is continuous throughout the project and once set up we can easily perform the analysis. Some software packages might have a feature to perform the analysis.
3. It is like a 'Performance Camera' where we take a picture of the project performance at a specific time interval.
4. It is also like a thermometer that would help us gauge the health of the project.

On the other hand, earned value management, like any other project management technique, is not enough on its own to help us manage projects since the technique does have some limitations; for example in a fixed price contract the client does not have access to the actual cost.

In addition to earn value management, there are other techniques we use to monitor project performance. These techniques include float analysis, lean techniques, contingency consumption, document control, traceability matrices, in addition to many others.

4.6.2 Quality, Safety, Health, and Environment

In the project development phase, we have identified the relevant Q/SHE standards and regulations that the team will use, or have to comply with during project delivery. During project delivery, the effort will shift to assurance and control.

Control is about testing, measuring, checking, and other physical inspection activities that would help us determine whether an item, a deliverable, a work package is in line with the plan and/or standards. There are a variety of control actions and tools that we could use to help us in this area, such as cause-and-effect diagrams, flowcharts, control charts, Pareto chart, among others. In case of deficiencies or deviations, it would be necessary to perform corrective actions, rework, or defect repair.

On the other hand, Q/SHE assurance would be a higher-level perspective and is about ensuring compliance. We can ensure Q/SHE compliance by thorough reviews and audit of the other Q/SHE and other implementation activities.

4.6.3 Human Resources and Communication

In the planning period, the team had defined the human resources requirements for the project. We would have mobilized some of those resources early to help with the project management planning and project definition, others we need for implementing the work and we usually mobilize them at the start of the execution process, or in the case of the whole project, we mobilize them for implementation.

During every stage, whenever we mobilize a team, we need to perform a variety of actions and activities to ensure cohesiveness of the team works toward achieving the ultimate objectives. These activities include team formation, team building, team management, stakeholders' communication, manage conflicts, shift roles, reward high performers, among other stakeholders' actions.

It is also worth mentioning, again, that on many projects, we would outsource the implementation work. In that case, the client's project management team focuses on managing the contract, rather than the management of the people performing the detailed work. The service providers will manage their own people. However, we still need to ensure alignment among the client and service providers personnel.

4.6.4 Risk Control

Like all the other topics that we have covered, there is a plan for managing risks, but in risk management, we have more than one plan. We have the risk management plan, which is about the overall management of risks on the project and there are the risk response plans for the identified and assessed risks. Yet, during the implementation things happen to justify the need to monitor the project performance to ensure control.

Risk management is not an exception to the above sequence. In the project definition package, we identify various project risks that we could face during delivery, we assess them, we prioritize them, and we even developed response strategies for the various risks. Further, if some risks were specific to the delivery phase, we should have resolved them.[62]

The implementation stage is like all other stages, will have its own risks, in addition to any risks from earlier stages. We deal with them per the normal organizational processes that we have in place.

Risk control is about ensuring that we have acted upon the established response strategies for the high priority risks and measuring the effectiveness of the responses. Yet, some risks we either actively or passively accepted[63]. For these, medium and low priority, risks, the team will have them on the risk register, and a watch list so we can monitor them. Continuous monitoring is important in order to respond quickly if the need arise.

Just be careful with the watch list. One of our clients in the past jokingly called the threats on the watch list as "The Ignore List", and opportunities on the watch list as "The Wishful Thinking List"; we trust that this is not your reality!

4.6.5 Contract Administration

The last topic in this section is the easiest.

Your homework for the rest of the day is to re-read everything we wrote in this chapter and change the word **project**, everywhere it occurs, with the word **contract**. This is not a joke!

Contract administration is about management and control; inclusive of scope, time, cost, quality, risk… but as it relates to the work that is included in the contract. Your whole project could be in one contract or you could have many contracts on the same project.

The only new additions that we offer here are:

1. Interface management, which we will need when you have multiple providers with interfaces among each other. Contractors' interfaces are challenging, and would require a great deal of attention. The interfaces are areas that lead to potential ambiguity, gaps, and conflict and we must manage them well. On major projects with many interfaces, an Interface Manager or even Interface Team would likely be necessary.
2. In contract administration there is the need for oversight and management of the contract in addition to, management of the work performed. This is highly complicated in fixed price contracts.
3. There is also the question of progress measurement and progress payment in case of extended contracts.

Final words about contracts – clear language is in; complicated legal lingo should be out. Use simple language, clear and unambiguous and with as much or as little details as possible to clarify the requirements.

4.7 Operation Readiness

Do not jump ahead – we are not in the operation readiness stage yet; that is the next chapter. We mention it here since it is necessary for SG6.

Depend on the type of project, sometime during the implementation stage, if not much earlier, the sponsor will need to assemble the operation team to start working on getting ready for the handover and for the operation of the 'product of the project'[64]. Operation readiness is typically substantial and requires a great deal of effort.

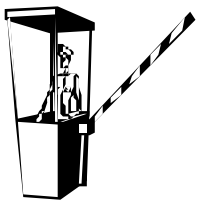
Handover is the term we use that refer to the project management team handing over the responsibility of the output, the product of the project, to the operation team.

With this context, going through stage gate six we will need input from two teams, the project implementation team and the operation readiness team. Both teams should have the necessary work complete before the handover and going into initial operations.

4.8 Stage Gate Six (SG6): Ready For Handover

As we have just stated a great deal of effort would be taking place to get ready for the handover and operation of the 'product of the project'.

Stage gate six (SG6) is one of the final gates and its core purpose is for executive management, the team, the client, and other relevant stakeholders to decide whether the project physical work is complete enough to hand it over to operation. Operation must also verify this in order for them to **accept custody** of the 'project's product' from the project management team.



Please note that accepting the custody is not final acceptance; it is only about changing the driver from project management to operation, and it typically means that the physical work for the project is complete, and the client has accepted the work, conditionally[65], but further testing, commissioning, and initial operations are still required for final acceptance. In other words, this is a provisional acceptance.[66]

In closing this topic, we must stress that:

1. For some large projects, or projects with multiple semi-independent packages, we could have multiple review points with acceptance for each component or package on its own with the final gate approval happening at the handover of the last package.
2. The project management team is not out of the picture yet. There are always activities after handover, such as supporting operation, fixing defects, and other work that is not essential to complete prior to handover but is part of the project.

4.9 Stage Summary

Project implementation is a significant stage in term of effort, time, and cost. It is often the phase where we could face problems. It is when we might discover that our planning was not good enough or circumstances have changed drastically. During this stage is where reality set, and Murphy[67] comes visiting, often.

Our implementation effort and performance, is a function of too many variables, such as the organization maturity, the planning effort, the number and quality of the service providers, project environmental conditions, along with external factors. The ability to manage people, resources, conflicts, requirements, expectations, and stakeholders could mean the difference between success and failure. In addition, this is the stage where we capture anything that we might have missed, or face severe consequences during operation.

This would be an appropriate time to discuss project failure. Project fails for many reasons but if we were to categorize, group the reasons one can say project fails for one of four major reasons:

- Poor or bad initiation; this could happen due to improper feasibility study or poor setting the project objectives,
- Poor or bad planning; whether due to team competence or lack of organizational system and historical data,
- Poor implementation; again this could be due to team competence or other factors, and
- External factors; where the project environment, might have changed drastically, and beyond the control of the project manager and team.

Once again, implementation is the stage that would require most of the effort, consume most of the funds, and it is possibly, where one would notice a project going bad, the team must pay special attention to this stage.

It is also crucial, that during this stage, the project team and operation personnel work hand-in-hand to achieve a common objective. A statement easier said than done!

5 Project Operation Readiness Stage

5.1 The Stage Overview

The fifth stage on the project life span of **CAM²P™** is the operation readiness stage.

The focus of this stage is on testing, commissioning, and similar work that is necessary to start the initial operation, in preparation of the permanent operation of the new product. In some situations, initial operations could be a pilot period.[68]

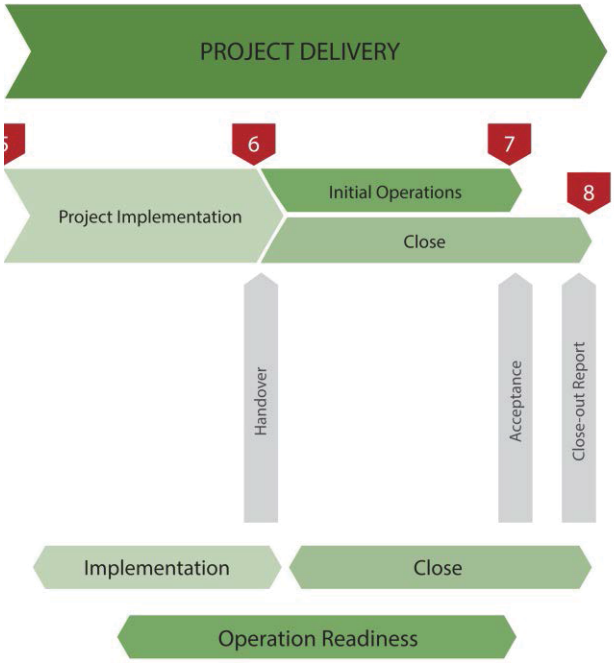


Figure 18: Project Operation Readiness Stage (Part of the Project Delivery Phase)

Whether there is a pilot or not, it is likely that the project would include operation for a 'period of time', after handover, and until the client, operation, end users can grant final acceptance.

The time span of the stage is not well defined. It usually starts with the start of the implementation stage, or sometime during the stage, and ends with final acceptance. In some projects, such as organizational change project, this stage could start much earlier, as soon as the project's launch stage, after the PAD.

The major deliverables are provisional acceptance (handover) and the final acceptance. There are many other intermediate deliverables, which we will mention later.

There is only one gate, SG7, which is concerned with the final acceptance, clearing the project management team to finalize project closure. However, SG6 is also happening during this stage but we placed that gate with implementation stage, since its focus is, mostly, on implementation work.

5.2 Special Considerations

Before we discuss the sequence, it is important to highlight a few important points:

1) In some industries, or on some projects, this stage might not be required. This is likely to be the case on some service projects or even research and development projects. However, on most, if not all, facilities, technology, or similar projects, this stage is essential.

2) The start and end of the stage are more dynamic than the other stages with the starting point could be anytime during project implementation, or even earlier in some cases. Although we define the end as 'final acceptance', but where that is, might not be clear.
3) It is common that operation personnel will perform the operation readiness work, not the project management team. However, both teams, the operation readiness team and project team, must work in a highly collaborative matter and at times, we can integrate both teams. Operation team leader typically reports directly to the sponsor.
4) We do not recall any project management book that includes operation readiness as an independent stage or even as a substantial topic. We are not sure why, although we can speculate two possibilities: (a) it is not required for every project and (b) it is not typically the responsibility of the project manager. However, similar to the pre-launch stage, we view this is an essential and substantial component of work that is required to deliver a project. Therefore, the Customizable and Adaptable Methodology for Managing Projects™ (CAM²P™) includes this as a separate stage.

5.3 The Stage Sequence

With the above clarified, what is the sequence of events?

Sometime after the start of implementation, the sponsor will need to assemble a team to work on operation readiness.

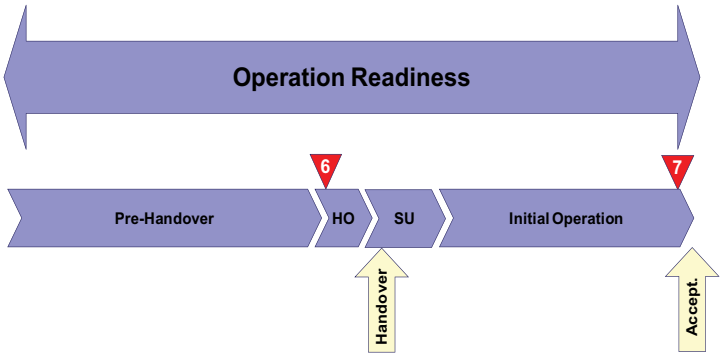
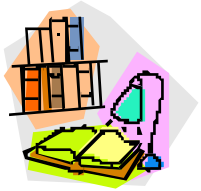


Figure 19: Operation Readiness Sub-Stages

The team will carry out crucial pre-handover activities that would allow the operation team to take the custody from the project management team at handover (HO). Handover will require time, minutes to weeks or months; which is a function of the type of project; hence the use of the shape with "HO" in Figure 19.



Post-handover the team will perform the start-up (SU) activities for the 'product' of the project. Similar to handover, start up could take minutes or months.

If required, there will be a pilot sub-stage or an initial operation period, which will continue until final acceptance. If there is a pilot, then we will show this via another chevron shape after SU or keep it as a part of Initial Operation period.

5.4 Mapping the Process Groups

Like all of the other stages, the processes of the PMBOK® Guide apply here as well.

1. The point of initiating this stage is not well defined but nonetheless the stage still requires formal initiation. Unless otherwise specified, initiation is at SG5, same as implementation.
2. With initiation kicking off the operation readiness team, the team management will work on finalizing the plan for the operation readiness activities, inclusive of pre-handover, final acceptance, and passing thru handover and initial operation.
3. With the detailed plan in place, we move ahead with executing the stage work.
4. Monitoring and controlling would be happening throughout the stage.
5. Finally, closing this stage would happen with final acceptance. Closing this stage would also clear the organization to finalize the project closure.

5.5 Pre-Handover Activities

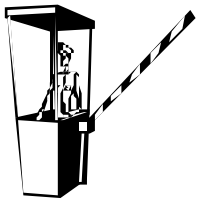
The pre-handover activities could vary greatly from one project to another and one domain to another. In the process industry (oil & gas, petrochemical…) and industrial projects, pre-handover activities can require a huge effort. However, for most projects, the pre-handover effort starts during implementation and continue to the handover point and initial operations.

What are these activities? Again varies from industry to industry but here are some suggestions:

1. For a new business[69], the activities can include establishing the accounting systems, human resources policies, hiring, training, and marketing, among other items as necessary. In other words, all of the activities that we need to start operation upon the completion of the new business set-up.
2. For a software implementation project, the activities can be preparing the testing scripts, procedures for change over from the old system to the new, operation procedures, and training of the staff on the new system.
3. For industrial project, some of the deliverables would be operations procedures, safety procedures, pre-commissioning activities, commissioning procedures, training of staff, maintenance procedures, inclusion of the new facilities into the organization's change management system, and any other work that might be necessary.

Once the team accomplishes all of these activities, and the deliverables of the implementation stage are also complete, then operation and project management teams would be ready to initiate the handover activities and transition the custody to operation.

5.6 Handover Activities



The handover activities are the activities the teams perform around the time of handover. These activities include verification of work packages' completion and product completion. We verify scope and product completion through inspections, testing, and reviews. To perform the reviews, it is likely that to have personnel from the project team, operation team, and service provider team working together.

The objective of these reviews and inspections is to ensure that all items, the teams completed in accordance with the project requirements and that they are ready for sign off, acceptance, by the client. At this time, there might be some remaining issues that are not complete, which we call 'punch list items', 'snag list items', or 'exceptions list'. If it is necessary to complete these 'items' to meet the handover requirements, then the project team must finish the work and verify completion before the client can accept the custody.

On the other hand, if these items do not affect initial operation, then operation personnel can proceed through the handover process, and accept custody, on the condition that the project team will complete these remaining items, post-handover.

5.7 Initial Operations

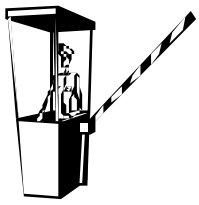
We use the term initial operations[70] to stress that this is not the permanent status, meaning no permanent operation yet. What is included here? It all depends on industry and projects.

In general, and what is common, is that the initial operation starts after the client accepts the output at the handover point, at SG6. As mentioned earlier, at SG6 there is provisional acceptance or interim acceptance. The client performs various commissioning, or start-up, activities in final preparation for operation. This could be a sub-stage on its own and we call it start-up or commissioning activities.

Once the client is ready and satisfied that all individual components of the products are okay and functioning as expected, they start full operation of the facility, which we call initial operation. Initial operation and normal operation are essentially the same in term of the work or what is happening physically, the only difference is that initial operation is taking place prior to final acceptance. Operation personnel would closely monitor the initial operation and likely operate at reduced capacity. This is necessary in order to build a level of comfort that all is working well and as expected.

The above is the likely situation in various projects' type, especially industrial. As we mentioned before, for other projects initial operation might not be required. In those situations, we might go straight from handover into immediate and full-scale operation. In other instances, we might have initial operation that we call a pilot. In those situations, the operation will be only for a unit or section of the project or organization.

5.8 Stage Gate Seven (SG7): Final Acceptance



If the project is a new facility, the organization will have a requirement for a final acceptance test. The test will be the final step before final clearance. Such a test could be to verify that the new facility is able to produce at the design capacity, or for any other reasons. There might be other requirements, which are often contractual, such as the warranty period on the installed equipment, among other factors to consider at this time.

Therefore, if everything is satisfactory at SG7, the organization will issue the final acceptance certificate, or notice, and with this certificate, the project is essentially complete, at least in the eyes of the end users, the client. All what remains is the final closure.

5.9 Stage Summary

The fifth stage on the project life span of the model is the operation readiness stage.

Most of the work of this stage is by operational personnel or end users representatives in collaboration and the support of the project management team. We divide this stage into multiple parts or sub-stages, which is a function of the type of project or industry. Not all of these sub-stages would be required on all projects.

We also re-stress that most literatures on project management does not show operation readiness as a separate stage but since the Customizable and Adaptable Methodology for Managing Projects™ take a holistic view of a project than operation readiness is an essential component of the project delivery and project life span, same as the pre-launch stage.

6 Project Close Stage

6.1 The Stage Overview

The sixth and last stage on the project life span of the Customizable and Adaptable Methodology for Managing Projects™ is the project close stage.

The focus of this stage is on properly closing the project and includes all of the related activities, such as gathering the final lessons learned, updating employees' files, documenting project performance metrics, updating organizational records, among other activities. During project close stage, the organization should also include project success evaluation, and benefits' realization, where possible[71].

The time span of the stage starts with handover. However, final closure cannot take place until after final acceptance.

The major deliverable is the project close out report. Although, there are other items at this stage, they could be part of the close out report or independent deliverables.

There is only one gate applicable to this stage, SG8. Stage gate 8 represents the organization's management acceptance of the project and close out activities. However, SG7 do take place during the time span of the project close stage, but as we discussed in the previous chapter, SG7 is for final acceptance of the product of the project.

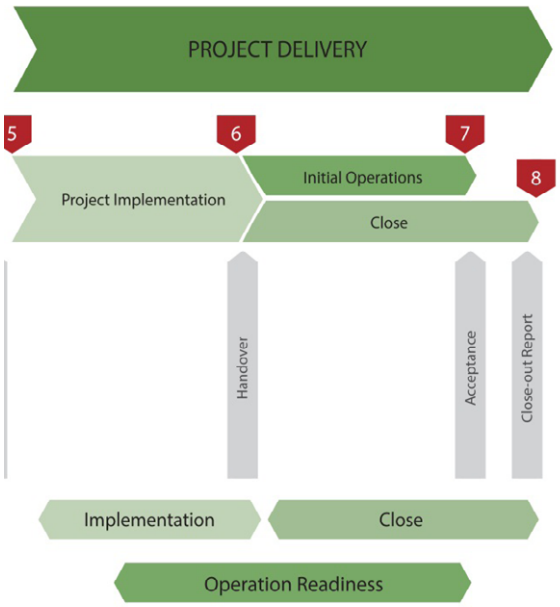


Figure 20: Project Close Stage (Part of the Project Delivery Phase)

6.2 The Stage Sequence

The formal project close stage starts with handover from the project team to operation personnel and continues throughout the initial operations period. The project management team can complete most of the project close activities prior to SG7; however, they cannot formally close the project until the final acceptance. One possible major activity that can take place after SG7 is a benefits realization exercise and success measurements, which we will discuss later.

It is also important to recognize that stages' closing activities take place during each of the other stages and we document those activities during the stages' closure. The team will collect and summarize all stage closure output as part of the final project close out report. The close out report (COR) leads to the final gate.

6.3 Mapping the Process Groups

Stage initiation is with the stage gate approval at SG6. Initiating the stage is the fact of initiating the final project closure activities.

During the project management plan, the team should have asked and answered the question of 'how to close the project'. In other words, there should be an initial plan for properly closing the project. Now that the team reached this milestone, the team expands on that initial plan and develops the detailed plan for the stage.

With the plan in place, we move ahead with executing the stage work, which is obviously conducting the closing activities. It is worth noting that we already have information for the project closure that we have gathered from the various stage closures.

Even during the project close stage, we have to monitor and control the stage. In this case, control is to ensure that we do not sidetrack, ensure proper closure, and complete all activities and reports.

Finally, closing this stage would also coincide with closing the project.

6.4 Importance of Proper Project Closure

Before we go on into the details of the close out report, we want to refresh the readers on the importance of this stage and close out report.

As we mentioned earlier in this eBook Series, mostly in Part I, some organization often neglect this stage, partially due to the fact, that they re-assign the project manager and team almost as soon as the project is handed over. On the other hands, to achieve a higher level of organizational project management maturity, learning and continual improvements are essential elements, which we can only achieve through proper project and stages closure.

Further, significant effort and amount of work takes place between the idea and project completion, which is crucial for organizational learning. If this learning is not documented, in a ready to access manner, a wealth of information is lost totally or lost in employees files, which is likely to be permanently lost with the next computer crash or employee departure.

Once upon a time, long time ago, the author was asked to establish a project support office to handle project control on an Alliance (multi-projects) contract. Under that contract, there was a portfolio of projects valued at more than 100 million dollar (US). These were projects in the petrochemical industry.

We established the office, formed the team, and as the team was starting their work, we discovered that the vast majority of projects, from the previous five years, were not closed. As a result, we had to assign a full time team member just to close these projects.

That was a nightmare job, since most of the people involved were not available – so closure ended up being limited to an accounting exercise to ensure that we captured all the costs for the company accounting system.

Unfortunately, so much was lost, no proper reconciliation or lessons learned!

Capturing the learning, should not happen at the end only, it is throughout the project. One possible approach to avoid missing critical information is to assign a team member, from the very start of the project, to stay behind and close the project.

In addition, the model advocates proper closure via the introduction of a stage gate, SG8. A stage gate clearly states that the project is not delivered to the owner organization, until it passes through this final gate.

6.5 The Close out Report

What are the major components of the close out report? It depends on the organizational policies. We suggest the items that we present in this figure.

These elements could be independent reports or part of one close out report.

6.5.1 Performance Reconciliation

The project performance reconciliation report is an essential document for organizational learning, since it documents what happened on the project from start to finish, with an emphasis on reconciling the differences between plan and actual.

Like the rest of the project closure processes, the performance reconciliation is an exercise for every stage.

1. During the project launch stage, the team can capture any performance variances from the project authorization to project management plan.
2. During the project definition stage, the team focus is to capture performance variances from project management plan to project detailed plan.
3. Finally, during project implementation and close stages the team can reconcile the differences between the final – the actual performance – and the project detailed plan.

Figure 21: The Elements of Project Close Out Report

What are these reconciliations all about?

They are about documenting the differences between what we planned and what actually happened on the project. These would be the performance variances, or deviations[72]. We should also include the changes[73] to plan along with reasons and sources of change, along with any predefined project changes metrics.

To facilitate the reconciliation, it is best if the team focuses on the differences for each project management function.

1. **Scope**: the scope reconciliation is to document whether we did deliver all of the scope required, no more no less. If not delivered, then what is different and reasons for the differences. Are these differences documented as changes or not and if not why? What are the consequences of the missing scope or additional scope?
2. **Quality, Safety, Health, and Environment (Q/SHE)**: in this area some questions would be, how did we perform on these functions? How does our safety record compare to the industry average or best in class? Did we have a higher rework ratio than the industry? Were we in line with industry? Did we have environmental issues? What caused them and how did we treat them?
3. **Time and Cost**: how did we perform in comparison to the project time and cost baselines? Were we within the acceptable tolerances? Did we use the reserve time and contingency allowances? Were they enough? Were the differences due to unusual circumstances, or were they related to the planning tools; which mean they could occur again? What are the factors that we should feed back to the owner of the organizational records that would lead to updating these records?
4. **Human Resources and Communications**: did we have any exceptional performances that one should note and offer commendations? How about the effectiveness of the communication plan, did we have gaps or not, and what went well or not well. Were the project manager and the functional managers able to cooperate properly or where there issues to address for the future?
5. **Risk Management**: Did we follow the process well? How effective were we in responding to risks? Did we do a good job in identifying risks? Did we end up encountering many new risks during the implementation stage and execution processes of the various stages? Were the risks' assigned owners effective in managing the risks or were there issues that we should have addressed as learning opportunities?
6. **Contract Management**: as we said earlier, contract management is all of the above but at these topics relate to the given contract(s).
7. **Summary of Metrics**: every project has performance metrics[74] and this report should include a summary of these metrics. Some metrics can be cost performance index, schedule performance index, project management index, change order index, and other metrics.

6.5.2 Lessons Learned

Lessons Learned are extremely important and the project management team must capture them throughout the project various stages.

How can we capture lessons learned?

With a mature project management culture within an organization, every team member must be aware of the importance of lessons learned. Therefore, whenever a team member discovers a new lesson, he/she should document it. One must not wait to the end of a stage or even worst, end of the project.

At the end of a stage or project, the team could come together and reflect back to identify any other lessons that they might have encountered but were not recognized except in hindsight, after the fact. Further, as the team assembles the performance report, other lessons learned might appear.

Further, a mature team recognizes that lessons are about the good and the bad; not about what went wrong, only.

Final notice: lessons learned can only work in mature organizations because lessons should be clear and open and in a culture of blame or scapegoats, one cannot honestly expect many valuable lessons.

6.5.3 Benefits Realization Study

An organization authorizes a project because executive management recognizes that such a project would add value to the organization. Well, now we are done – did the project add value? Did the organization realize the benefits that they expected when they authorized this project? Can we even assess this?

Let us consider the following, the feasibility study determines if the idea is valid and viable; the benefits realization study determines if we achieved the objectives. In other words, the later study validates the earlier study.

It is important to note that for some projects, we might not have all the data required to complete a comprehensive benefits realization study at the time of project closure. In various situations, a proper detailed study to validate the business case or assess whether we realize the benefits cannot take place until the product has been in operation for some time, may be a few years. However, for other projects, we could still perform a study before project close that give us enough indication about success of the project.

6.5.4 Dimensions of Project Success

Measuring project success is another way that we can evaluate if the project delivered the expected benefits. The only difference is that measuring success, per CAM²P™, includes four distinct dimensions, which we address in Part III of this eBook Series.

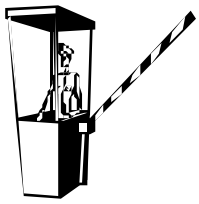
6.5.5 Organizational Records Update

Every organization that has adopted project management as a formal function shall have a system in place that includes the organizational records or system for project management and past projects data.

We do recognize that some organizations are quite young and do not have the history or project records and others have not kept the records in an organized manner for ready access. In either case, it is necessary to establish a system for record keeping and maintaining information from past projects. The records are likely to include a methodology, procedures, guidelines, policies, and other relevant information. In addition, the records include information from past projects such as cost and time information.

Therefore, the team must incorporate the reports that we discussed in this chapter with the organizational records. In addition, the project management team can summarize key factors from these reports to include in a summary format into a database for ready retrieval in the future and for overall analysis of the organizational portfolio performance.

6.6 Stage Gate Eight (SG8): Project Close



This final gate is quite different from all of the other gates since there is nothing after it. The earlier gates were important as control points. Most of them have two objectives: (1) accept the work of the previous stage or deliverables and (2) if the work is acceptable, decide on whether the project is to continue or not onto the next stage. On the other hand, stage gate eight (SG8) is only required to verify that the project closure is completed in a proper manner.

Because there is nothing after this point, project management literature does not show a gate here and the project is just closed. Some would consider the act of closure as a gate but this is questionable if there no authority verifying that project closure is proper, hence a potential gap. We emphasize the need for stage gate as an important contributor to project management organizational maturity, stressing the point that the project is not closed until the organization says so. Meaning all of the requirements for closure are satisfied.

6.7 Stage Summary

The sixth and last stage on the project life span of the model is the project close stage.

It is still somewhat common that some organizations either completely ignore this stage and closing processes, or they do just close the project with a report that is brief and with limited use and value. In the CAM²P™ model, we take the perspective of the organization and strategic thinking, which means that project closure, is essential for any organization that has projects.

With the strategic perspective, the focus of this stage is on properly closing the project with all of the related activities. As we have defined, we did specify the need for five major deliverables as part of the project close out report and these are project performance reconciliation, lessons learned, benefits realization study, success measurement, and updates of organizational records.

The final gate is important to stress that the project is not closed, until the team deliver a proper close out report and this gate will help us ensure this status.

Appendix A: The Model Stages

Project Stage	Stage Main Focus
Pre-Launch	The project pre-launch stage is the first stage of the project. - The focus of this stage is to understand and validate the idea for a new project. - The time span of the stage is from idea to project authorization document.
Launch	The second stage is the project launch stage. - The focus of this stage is to define the project basic requirements and establish the project management plan. - The time span of the stage is from project authorization to project management plan.
Definition	The third stage is the project definition stage. - Project definition stage is about developing the project detailed plan. - The project detailed plan is about providing all of the necessary details for the project, that we need for implementation.
Implementation	The fourth stage is the project implementation stage. - The focus of this stage is to implement the project. - Implementation is the action of doing the physical work for the project to complete the required deliverables; leading to handover of the complete product, service, or result; i.e. project output.
Operation Readiness	The fifth stage is the operation readiness stage. - The focus of this stage is on testing, commissioning, and performing similar work, prior to handing over the product and starting initial operation; in preparation of the permanent operation of the new product. - It would also include operation for a period of time, post-handover, until the operation (client) can grant final acceptance.
Close	The focus of this stage is on properly closing the project and includes all of the related activities, such as: gathering the lessons learned, updating employees' files, documenting project performance metrics, updating organizational records, among other activities. It is likely to include project success evaluation, i.e. benefits realization.

Appendix B: The Model Gates

Stage Gate	Name / Purpose / Description of the Gate
SG1	Name: idea approval Purpose: strategic alignment Description: The CAM²P™ Model takes the view that every project must be in line with the organizational strategic direction and objectives.
SG2	Name: project initial approval Purpose: project authorization At this gate, executive management would review the feasibility study and accept it, if no modifications are required. If the project is not feasible, management terminates the project. If it is feasible, compare the project expected value to others within the organization, and if the project is a priority (higher value than other projects), then executive management would authorize the project.
SG3	Name: stakeholders' alignment Purpose: stakeholders' alignment SG3 primary objective is to ensure the stakeholders' alignment on the project basic requirements. In other words, did the project manager understand what is required to deliver this project? Requirements include characteristics of the outcome.

Stage Gate	Name / Purpose / Description of the Gate
SG4	Name: project management plan approval Purpose: approve the plan and gain advance funding, if necessary SG4 is about executive management approval of the project management strategy. For this gate, the project manager typically would also submit an updated estimate of the project cost and time, which would allow executive management to verify if the project is still viable and revisit the go/no-go decision. If required, management will also approve funding for the next stage; advance funding.
SG5	Name: final approval Purpose: approval of the PDP and final approval to proceed with implementation This gate is about the final approval of the project. The cost of the work performed before this point is minimal in comparison to the total project cost. Therefore, on most projects, this gate is crucial and the author labels it 'the point of no return' since once there is approval, it is likely that the project will proceed to completion.
SG6	Name: ready for handover Purpose: assess completion of implementation and readiness for handover This gate is concerned with review of the project implementation work and completion of the deliverables to determine if the project management team is ready to hand over the product to the end users, operation personnel.
SG7	Name: final acceptance Purpose: final acceptance of the project product This gate is concerned with the final acceptance of the result of the project, the output, clearing the project management team to finalize project closure.
SG8	Name: project close Purpose: official closure of the project and financial accounts This final gate is quite different from all of the other gates since there is nothing after it. We emphasis the need for the gate to stress the point that the project is not closed until all project deliverables are submitted and approved and the project close out report is one of those deliverable.

Appendix C: The Model Major Deliverables

Project Stage	Deliverable	Description
Pre-Launch	Idea	The idea, or idea statement; also known as project vision, project statement, project brief, statement of work… It is simply a very short document, a few sentences, that describe the idea for the project.
	Feasibility Study	The feasibility study is primarily about what we call 'validating the idea'; i.e. to determine if the project is viable.
	Project Authorization Document	The project authorization document (PAD) is the document that authorizes the project. What is the PAD is really telling us is that executive management has the clear intent to take the project to completion yet they are only authorizing the next stage.
Launch	Basic Requirements Document	The project basic requirements document (BRD) is the document that defines the key characteristics, features, and other requirements for the output of the project. This is essentially the high-level scope of the project.
	Project Management Plan	The project management plan is the document that presents the project management strategy/approach for the project. It defines the various steps and work that the team would perform from that point onward; to project close.

Project Stage	Deliverable	Description
Definition	Project Detailed Plan	The project detailed plan is that the document(s) that provide all of the necessary details for the project, such as: the scope definition. It will also include the detailed quality, safety, environmental planning details. The detailed schedule and cost estimate are also included here along with various other functions.
	Request for Final Approval	The request for approval could be just a short letter or form that the project management completes with significant input from the sponsor in order to submit to senior management (decision makers) for the final approval of the project and the authorization of the necessary funds. *We do not show this deliverable on the graphic of the model.*
Implementation	The Deliverables	There is no specific document for this stage. However, this whole stage is about completing the various deliverables that are required by the project leading to the ultimate delivery of the final project product or output. *We do not show any specific deliverable on the graphic of the model for these 'product' deliverables.*
Operation Readiness	Handover 'Provisional Acceptance'	Handover, or provisional acceptance, is the client (operation) initial acceptance of the ***product of the project*** from the project management team. It is usually an indication that the work is essentially complete and the client is ready to start using the new product; or at least commission it.
	Final Acceptance	Once all of the work is complete, the new project is in use, there is often a final acceptance that will take place sometime after handover. For industrial projects, the final acceptance is the result of a final acceptance test; like a capacity test.
	Others	Many other deliverables lead to either of the previous two deliverables. Such as operation and maintenance procedures, training, safety reviews, among other activities. *We do not show them on the graphics of the model.*
Close	Close Out Report	The major deliverable in the project close stage is the project close out report documenting the result of the project work. This report includes reconciliation of the events that took place during the project development and delivery, in addition to lessons learned, organizational records update, among other organizational requirements.
	Others	There are other deliverables at this stage and they could be part of the close out report or they could be independent deliverables. Some of these are the Lessons Learned, Benefits Realization Study, Success Measurements, among other items.
There are many other deliverables in a given project. Some of these could be specific to a phase or a stage. Others could be for special situations or industry dependent. Therefore, the deliverables that we have included in this Series are the main stage deliverables.		

Appendix D: Bibliography

AACE® International. *Cost Estimate Classification System.* n.d.

Ajam, Mounir A. *Project Management for the Accidental Project Manager.* Bookboon.com, 2013.

———. *Project Management Wisdom.* November 2, 2012. http://www.maxwideman.com/guests/redefining_pm/intro.htm (accessed November 2, 2012).

———. "Are you an accidental project manager." *Redefining Project Management Blog*, September 12, 2012: 1.

———. "The accidental project manager – challenge to executives." *Redefining Project Management Blog*, September 18, 2012: 1.

———. *Redefining the Basics of Project Management.* Amioun, Al-Koura, Lebanon: SUKAD Multimedia, 2013.

———. *Redefining the Basics of Project Management.* Amioun: SUKAD Multimedia, 2013.

———. *The Inheritance, A Story about Friendship, Community, and Project Management.* Dubai, United Arab Emirates: Mounir Ajam, 2010.

Ajam, Mounir. *Project Management Wisdom.* November 2, 2012. http://www.maxwideman.com/guests/redefining_pm/intro.htm (accessed November 2, 2012).

———. "Are you an accidental project manager." *Redefining Project Management Blog*, September 12, 2012: 1.

———. "The accidental project manager – challenge to executives." *Redefining Project Management Blog*, September 18, 2012: 1.

Bucero, Alfonso. *Today is a Good Day! Attitudes for Achieving Project Success.* Multi-Media Publications Inc., 2010.

Encyclopedia Britannica. n.d. http://www.britannica.com/EBchecked/topic/163723/diminishing-returns (accessed February 15, 2013).

Englund, Randall L. and Alfonso Bucero. *Project Sponsorship.* San Francisco, California: Jossey-Bass, A Wiley Imprint, 2006.

———. *Project Sponsorship.* San Francisco, California: Jossey-Bass, A Wiley Imprint, 2006.

Fleming, Quentin W. and Joel M. Koppelman. *Earned Value Project Management.* Third Edition. Newtown Square, Pennsylvania: The Project Management Insttitute, Inc., 2005.

———. *Earned Value Project Management.* Third Edition. Newtown Square, Pennsylvania: The Project Management Institute, Inc., 2005.

International Project Management Association (IPMA). *IPMA Competence Baseline (ICB).* Version 3.0. Edited by Editorial Committee. IPMA, 2006.

Janice Thomas, PhD and Mark Mullaly, PMP. *Researching the Value of Project Management.* The Project Management Institute, 2008.

PMI. *A Guide to the Project Management Body of Knowledge.* Fifth Edition. Project Management Institute, Inc., 2013.

———. *A Guide to the Project Management Body of Knowledge.* Fourth Edition. Newtown Square, Pennsylvania: Project Management Institute, Inc., 2008.

Pollack, J. "The Changing Paradigms of Project Management." (International Journal of Project Management) 25 (2007): 266-274.

Project Management Institute. *A Guide to the Project Management Body of Knowledge.* Fifth. The Project Management Institute, 2013.

———. *A Guide to the Project Management Body of Knowledge.* Fourth Edition. Newtown Square, Pennsylvania: The Project Management Institute, Inc., 2008.

———. *Practice Standard for Earned Value Management.* Newtown Square, Pennsylvania: The Project Management Institute, Inc., 2005.

———. *Practice Standard for Work Breakdown Structure.* Second Edition. Newtown Square, Pennsylvania: The Project Management Institute, Inc., 2006.

Schiff, Jennifer Lonoff. *CIO Online Magazine.* January 15, 2013. http://www.cio.com/article/726888/7_Must_Have_Project_Management_Skills_for_IT_Pros?source=CIONLE_nlt_projmgmt_2013-01-24 (accessed January 24, 2013).

The Standish Group. n.d.

Appendix E: Summary Outlines for All Four eBooks

Part I (eBook 1)

Section 1: Challenges and Opportunities

Chapter 1: Growth of Project Management
Chapter 2: Challenges: The Growing Pains
Chapter 3: Opportunities for Sustainable Growth

Section 2: Project Management Methodology

Chapter 4: Rationale and Model Perspectives
Chapter 5: Fundamental Concepts
Chapter 6: Introducing the Model
Chapter 7: Alignment to Global Standards
Chapter 8: Alignment to PMBOK® Guide

Part II (eBook 2)

Section 1: Project Concept Phase

Chapter 1: Project Pre-Launch Stage

Section 2: Project Development Phase

Chapter 2: Project Launch Stage
Chapter 3: Project Definition Stage

Section 3: Project Delivery Phase

Chapter 4: Project Implementation Stage
Chapter 5: Project Operations Readiness Stage
Chapter 6: Project Close Stage

Part III (eBook 3)

Section 1: Life Cycle Perspectives

Chapter 1: Life Cycles 360º

Section 2: Across the Project Life Span

Chapter 2: Project Approvals
Chapter 3: Project Estimates
Chapter 4: Project Control: Moving Baselines
Chapter 5: Project Risk Management
Chapter 6: Project Stakeholders
Chapter 7: Project Success

Section 3: Model Principal Features

Chapter 8: Applying the Model
Chapter 9: Customizing the Model
Chapter 10: Adapting the Model
Chapter 11: Potential Pitfalls

Part IV (eBook 4)

Section 1: Practical Application of the Methodology

Chapter 1: Samples from CAM²P™ Workshops
Chapter 2: Capital Investment Project

Section 2: Writing a Book Project

Chapter 3: Project Pre-Launch Stage
Chapter 4: Project Launch Stage
Chapter 5: Project Definition Stage
Chapter 6: Project Implementation Stage
Chapter 7: Project Close Stage

Author Biography

Mounir A. Ajam

Mr. Ajam is an entrepreneur, author, speaker, coach, advisor, consultant, volunteer leader, and project management thought leader.

He is the author of '*The Inheritance, a Story about Friendship, Community, and Project Management*' and *'Project Management for the Accidental Project Manager'*, and is working on '*Redefining the Basics of Project Management*', which is not yet published.

He is a senior executive with close to three decades of outstanding global and practical experience in capital project industries such as engineering, construction, petroleum, utilities and project management. He has worked on projects worth billions of US dollars in North America, Europe, South East Asia, and West Asia.

Mr. Ajam is a co-founder and the Chief Executive Officer of SUKAD Group, a leading project management provider with offices in Lebanon and Dubai, United Arab Emirates.

Mr. Ajam and SUKAD play quite an active role in the project management community through various professional activities that are open to community members at no cost. He is a true volunteer servant leader. He is heavily involved with the project management community at the regional and global levels. Globally, he has served in various roles and capacities, such as serving on the Global Advisory Group to the Project Management Institute (PMI®) Registered Education Provider program and as a judge for various PMI® educational awards. He served on the 2008 PMI® EMEA (Europe-Middle East-Africa) Congress Project Action Team. He is also a graduate of the PMI Leadership Institute Master Class.

In West Asia, Mr. Ajam served on the board of directors for the PMI chapter in the Arabian Gulf. He led an effort to establish a PMI chapter in the United Arab Emirates. He also led the effort to establish the Global Project and Process Management Association (GPPMA) and served as its board chairperson for three years.

Mr. Ajam is an advocate of project management and recognizes its strategic value. He contributes to project management growth by publishing professional papers and articles on numerous platforms, such as PMI Congresses, Construction Week Magazine, Dubai Quality Group, DKV Experts Channel, PMForum.com, Wamda.com, and other publications. He is the main author on the SUKAD blog (http://blog.sukad.com), in addition to a personal blog.

For more information about Mr. Ajam, please refer to his personal page at www.mounirajam.com.

The Foundation

Twenty percent (20%) of the author's revenues from this work will be redirected to a foundation, a not-for-profit organization. This is in addition to 100% of the revenues from his previous eBook, ***Project Management for the Accidental Project Manager***.

Al-Insan is the short name for the foundation, but the full name is **Insan Al-Mujtama Foundation**. The origin of the name is Arabic, to reflect and honor the home of the foundation.

- *Insan* means *Human,* and *Al-Insan* means *The Human*
- *Mujtama* means *Society* and *Al-Mujtama* means *The Society (also community)*
- The literal translation for *Insan Al-Mujtama* means *Human of The Society*

The above is the literal translation for the name. However, when we combine the two words, the phrase '*Insan Al-Mujtama*' has a more philosophical meaning. In simplistic terms, the concept is about the difference between an individualistic mindset and a collective, social, service-oriented mindset. This is what one might call social or national consciousness. With this in mind, the purpose of the foundation is to serve humanity through serving humans, directly or indirectly. It is our intention to encourage all to do their part to be or become ***The Human of The Society***, to be ***Insan Al-Mujtama***.

The main purpose of this foundation is to use project management as a social enabler to serve communities around the world. The concept is to use project management for 'life projects' and the following are examples of the programs that Al-Insan will run.

1. Provide complimentary professional services (learning and consultancy solutions) to non-government organizations (NGO). This is specific to NGOs operating and providing social services in the least developed countries and communities on an international basis. The ultimate purpose is to help these organizations build their capacity for delivering service.
2. Provide services directly to communities or in partnership with NGO/humanitarian organizations. The services can include youth camps, training, advisory, and coaching services, among other needs.
3. Reaching out to schoolchildren by training their teachers and working directly with students on school projects, with a focus on using project management as a key enabler.
4. Organize youth camps (high school and university students) to help them learn project management and apply the learning on community projects in their villages, towns, and communities.

Endnotes

1. Appendix E includes a summary outlines for all Parts.
2. The PMBOK® Guide is a leading reference for project management and includes a project management standard, approved by the American National Standards Institute (ANSI). The Project Management Institute (PMI) publishes the PMBOK® Guide, which is the work of a large number of volunteers. The latest version is the Fifth Edition.
3. Project life cycle is another term for project life span, and often used interchangeably. However, the author prefers the use of Project Life Span.
4. **Writing a Book Project;** the author followed this methodology to write a book.
5. In the Series, 'project domain' is used generically to refer to the project application area, industry, environment, or discipline.
6. Management and executive management refer to the organizational resources with the decision making power; this could be a steering committee, an executive committee, board of directors, shareholders, CEO, president, general manager or any other individual or organizational unit with the appropriate authority.
7. This could also be a person or an organizational unit.
8. The project sponsor is senior management representative and would be the person responsible for the project but not the day-to-day project management. For further reading, we recommend Project Sponsorship by Mr. Randall L. Englund and Mr. Alfonso Bucero.
9. Project prioritization is part of portfolio management, which is about selecting the right project out of a portfolio of projects and programs; portfolio management is outside the scope of this book.
10. We say 'initial' because this is only an interim approval. In other words, here management is deciding to proceed with the project to completion but in reality, they are only approving the next stage. Management will reevaluate the decision at future stage gates.
11. This would be a **stage** charter and not a **project** charter.
12. We use 'team' here symbolically. Depend on the project, the team could be one person, a few, or a large number of professionals with diversity of skills and backgrounds. The team typically does not consist of the same individuals throughout the project; *refer to Part III Project Stakeholders chapter*.
13. Stage authorization, stage plan, stage close out report, and the other terms that we use here are to emphasize that there are documents that the team will issue at every stage, although they might have different names. These are the output of the PMBOK® Guide process groups, for each stage.
14. These comments apply to the whole Series.

15. We are not sure of the source of this term (there are too many online listing and could not determine origin) but it is about the ability of every employee in the organization to understand and visualize his/her role as a contributor to organizational strategic direction.
16. Refer to the risk management chapter in Part III.
17. In addition, the concept of approval at various gates, such as initial and final approval, and funding approval, are the subject of project approvals chapter in Part III.
18. For those who are familiar with the PMBOK® Guide, this would be quite similar to the Project Charter.
19. Refer to project stakeholders' chapter in Part III.
20. Part III includes a chapter on project success and how to measure it.
21. Make modifications from the standard model if necessary; such as combining stages or stage gates, adding sub-stages, among other changes that might be logical or necessary.
22. Refer to project approvals chapter in Part III.
23. Depend on the project size and complexity; there could be one stage plan or two; a stage management plan and a stage detailed plan.
24. This would be the **project** management plan – for the project. Remember, in the context of this Series, and methodology, whenever we use the term project we mean the whole project. If we need to refer to a stage, such as stage management plan, we will clearly state so.

25. A work breakdown structure (WBS) is "*A deliverable-oriented hierarchical decomposition of the work to be executed by the project team to accomplish the project objectives and create the required deliverables.*" (Project Management Institute 2006).
26. We have dedicated a chapter to discuss project success, the model's Four Dimensions of Project Success; refer to Part III of this Series.
27. Value Improving Practices (VIP) and Best Practices (BP) are similar concepts. They deal with practices that are not commonly used and if organizations use them properly, they can expect significant performance improvement in the areas of safety, quality, cost, schedule, performance, among other areas. VIP/BP should be limited in number since they are often differentiating factors between typical performance and best in class performance. Current management trends prefer the term 'leading practices.'
28. For further reading at this time, you can research this topic. Two primary sources would be the Construction Industry Institute (CII), CII use the term Best Practices, and Independent Project Analysis (IPA), which use Value Improving Practices.
29. In the context of the project management plan, the 'how to' is inclusive of how, who, when, what, and where.
30. Remember this include the how, where, when, who…
31. This is a common area of confusion, especially with technical professionals – they would always want to put the technical hats and jump into the definition, which we must avoid. Here we need the project management hat – not technical.
32. For those who are familiar with the PMBOK® Guide, these are the knowledge areas but not limited to them since in some industries there are other project management functions that are not in the PMBOK® Guide.
33. Notice that we are using the word 'plan', and not project management plan, or project detailed plan. This is by design; refer to project control chapter in Part III.
34. Refer to the chapter on project stakeholders in Part III. Also, refer to Chapter 5 in this Part for a detailed discussion of the Project Operation Readiness Stage.
35. Refer to Part III for further reading.
36. If the author is not mistaken, the 2000 edition of the PMBOK® Guide, did have a project management plan and a project plan but were later combined into one, which we think is leading to issues in the practice of project management.
37. Other terms for the stage name could be Preliminary Engineering stage, Architectural Design stage, or Front End Engineering Design (FEED), among other names.
38. For those who are new to project management: project management team is the team supporting the project manager in managing the project and includes cost, schedule, quality personnel, and others as necessary (safety, construction, logistics…). The project team includes the technical (or functional) professionals who will perform the detailed work of the project (designers, engineers, specialists…).

39. We have been using this term qualitative and quantitative control. What do they mean? Qualitative control is mostly about concept, idea, general direction – conceptual control… Whereas quantitative control is as the name indicates, about quantities, number of "gadgets"
40. If you are new to project management or not familiar with the PMBOK® Guide, this section is likely not relevant to you.
41. PMBOK® Guide defines the output of the project as a product, service, or result. A product being a physical facility (building, refinery); a service would be a project that deliver a service (deliver training, consultancy); a result is the output of research and development that other could use to deliver a service or further research and development (this work is an example).
42. Demote and promote is moving a WBS element down or up a level, or more, since the WBS is a hierarchy and drawn like an inverted tree or an organization chart. Therefore, promote an element is to put it at a higher level.
43. Refer to Text Box for a story and to Appendix E in Part I.
44. A work package is a WBS element that is at the bottom of a given branch, lowest level. Since it is a WBS element then it is a deliverable. A work package is a specific scope of work that the team can handle in a short time span, such as a workweek.
45. The work packages are an output from the earlier process; development of the scope and WBS
46. For a discussion on how many estimates, refer to Part III.
47. These are the names of estimating techniques.
48. We know this is an over simplification but the main point is that without good history and a database then estimating is just an exercise of guesswork; or just go with the flow and we know the cost at the end.
49. Please refer to the risk management chapter in Part III.
50. Product, service, or result comes from the PMBOK® Guide definition of a project.
51. We think it is clear that we are using the term service provider here in the general context to include, consultancy firms, contractors, sub-contractors, or any external agency that will perform work for a client. Although we are using the singular form, there could be more than one service provider.
52. We focus on control with this chapter since we can perform quantitative rather than qualitative control.
53. Remember, control is not limited to control against the project detailed plan during the project implementation. Controlling is happening from the idea statement. For further reading, refer to Part III.
54. Earned Value Management is a performance management technique that is crucial for project control and we will briefly discuss later in this chapter.
55. Refer to the scale on the left.
56. Refer to the scale on the right.

57. "The Abilene paradox is a paradox in which, a group of people collectively decide on a course of action that is counter to the preferences of any of the individuals in the group. It involves a common breakdown of group communication. Each member mistakenly believes that his or her own preferences are counter to the group's preferences and, therefore, does not raise objections. As a result, the group takes a trip, which they regret later." It is good reading. (http://en.wikipedia.org/wiki/Abilene_paradox).
58. Three cities in Lebanon; Beirut is the capital.
59. *Notice that most of the items we discuss here are execution and control processes.*
60. Two points for clarifications: (1) change in the context of this Series is about project change and not organizational change and (2) on construction projects; one might often use the term variation in lieu of contract change.
61. These cities are a few thousands' years old and have been continuously inhabited. They go back to the Phoenicians who settled on the Eastern Mediterranean.
62. Refer to Part III, Risk Management chapter.
63. Active acceptance is about a putting a response plan for a risk, which we consider as a medium priority, but we only implement the plan if the risk occurs. Whereas passive acceptance is doing nothing; i.e. we will figure out how to deal with that risk if it occurs; these risks should be low priority.

64. On major industrial projects, we would mobilize some of the operation team at the start of implementation and in some cases even earlier. For an organizational change project, operation readiness might start soon after the initial approval of the project.
65. We use the term conditional acceptance for three reasons, (a) it is not the final acceptance, (b) the project team might still need to perform some non-operation critical work, and (c) there might still be some deficiencies, which we could not discover readily during the handover.
66. In industrial projects this provisional acceptance might be called mechanical completion.
67. In reference to Murphy's law, which says: "if anything that could go wrong it will".
68. Pilot, in this context, mean experimental, where the project could start with a trial period. For example, an organization is embarking on changing their performance management system. After the completed design of the system, they might chose to roll it out in one department before all others. We do this to capture the learning in a control environment.
69. Yes, we view launching a new business as a project, notice the term 'launching the business as a project' and not the business itself. The project is complete when the business is ready to offer services.
70. Other terms: ramp-up and start-up; however, these other terms are not fully accurate. When we initially start the facility, then these terms are accurate but initial operations go beyond start-up.
71. Refer to Part III, chapter on measuring project success.
72. Variance is a performance deviation from the plan, possibly for external factors but could also be due to internal factors.
73. The term "change" to plan refers to conscious decision by the project stakeholders to change the plan.
74. Performance metrics or indicators, like Key Performance Indicators (KPI), but these are limited to a project performance and not the organization's performance.