Understanding the PMBOK Guide

Guide for the Most Famous Project Management Standard

Nader Khorrami Rad, PMP

Nader Khorrami Rad, PMP

Understanding the PMBOK Guide

A Simple Guide for the Most Famous Project Management
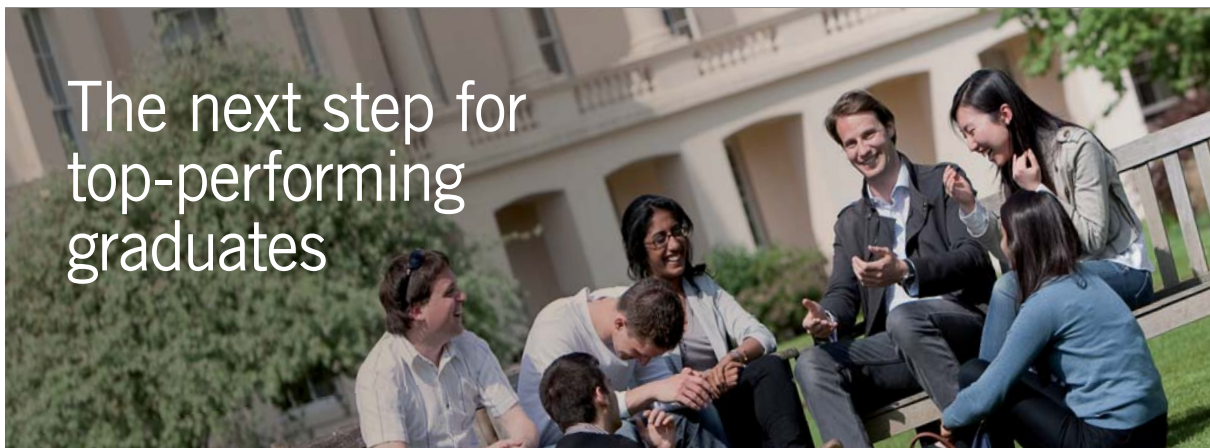
Standard

Understanding the PMBOK Guide

Contents

Download free eBooks at bookboon.com

About the Author

Nader Khorrami Rad is a consultant and an Author in the project management field. His career started in 1997 and has been involved in many projects, mostly as planning and control professional. He has written 37 books so far.

He has Civil Engineering BSc and Philosophy of Science Ms. He is also certified as PMP® (Project Management Professional), CSM® (Certified ScrumMaster) and PSM I (Professional ScrumMaster I).

Preface

The current approach in learning PMBOK Guide is "bottom-up": you have to learn a lot of detail in order to understand the whole standard. Many potential learners give up because this approach is extremely time-consuming. Others may give up, believing that it is jargon, because they are not able to understand the content in a short time.

I have tried to follow a top-down approach throughout this book and create a big picture without going into details. My goal is to prepare a fast and comfortable way of understanding the standard. You might find it enough for your needs or consider it an easy starting point for the long journey of completely learning the standard.

I hope that you find this book beneficial. I would be happy to have your feedback for improvements to the book. Please use the following email address and social media connections to contact me:

- Email: info@khorramirad.info
- LinkedIn: ir.linkedin.com/in/naderkhorramirad
- Twitter: twitter.com/#!/khorramirad

You can also find my other English resources in the following website:

- Website: http://www.pmarchy.com

Nader Khorrami Rad, PMP

May 2012

1   Introduction

1.1   The Real Nature of the PMBOK Guide

Project management is a practical knowledge; how can a theoretical text help us improve our project management?

That is a common question. The answer is simple: theories are made to be used in practice and most of the improvements we have had in the history of human beings is because of this. Besides that, the PMBOK Guide is not even a real theoretical text! PMBOK Guide is an organized collection of best practices. It is experiences of many of the finest project managers, organized in a single package. Had you ever wished you could sit down and listen to the experiences and opinions of best project managers for hours? Then you can enjoy the PMBOK Guide.

1.2   History of the PMBOK Guide

The Project Management Institute, PMI for short, owns, prepares and publishes the PMBOK Guide. PMI is a non-for-profit organization, formed in 1969.

PMBOK Guide is not the only standard of the PMI. The following are the current PMI standards:

- Fundamental standards:
    - A Guide to the Project Management Body of Knowledge (PMBOK® Guide)
    - Organizational Project Management Maturity Model (OPM3®)
    - The Standard for Program Management
    - The Standard for Portfolio Management

- Practice standards and frameworks:
    - Practice Standard for Project Risk Management
    - Practice Standard for Earned Value Management
    - Practice Standard for Project Configuration Management
    - Practice Standard for Work Breakdown Structures
    - Practice Standard for Scheduling
    - Practice Standard for Project Estimating
    - Project Manager Competency Development Framework

- Extensions:
    - Construction Extension to the PMBOK® Guide
    - Government Extension to the PMBOK® Guide

You can buy the hard copies or electronic versions from the PMI website (www.pmi.org) or other online bookstores. I highly recommend you to become a member of the organization, which costs $139 a year ($42 for students) and download all standards and use the library of articles for free. The only requirement for membership is to accept the PMI's code of ethics.

PMI has many standards, but its most important and famous one, is the PMBOK Guide. Draft of the first edition of the standard was published in 1987 and finalized in 1996. The current version is the fourth edition, which was published in 2008. Draft of the fifth edition is available now and the final version is due to publish at the end of the 2012. Figure 1.1 shows the timeline of the editions of the PMBOK Guide.
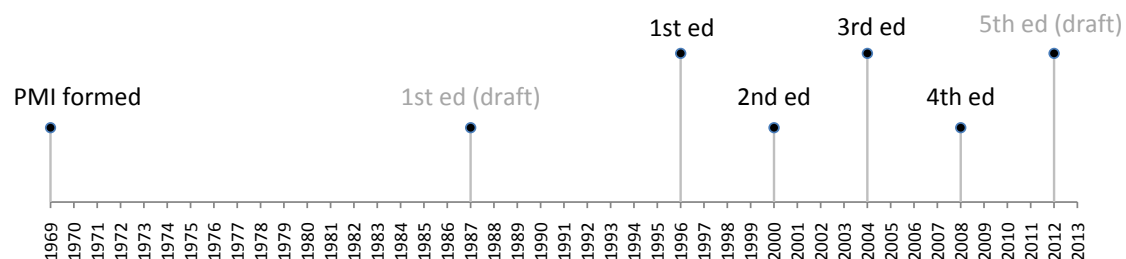
Figure 1.1 - timeline of the PMBOK Guide editions

1.3   PMI Certificates

PMI has the following professional certificates:

- Certified Associate in Project Management (CAPM)®
- Project Management Professional (PMP)®
- Program Management Professional (PgMP)®
- PMI Agile Certified Practitioner (PMI-ACP)ᔆᴹ
- PMI Risk Management Professional (PMI-RMP)®
- PMI Scheduling Professional (PMI-SP)®

The CAPM and PMP are about project management. PMP is the most famous certificate in the project management world. The CAPM is easier to obtain.

Neither of the PMP or the CAPM is limited to the PMBOK Guide. These examinations evaluate your knowledge of the project management; the PMBOK Guide is one of the resources you need to get familiar with.

These are the requirements that you need to have before applying for the PMP exam:

- A four-year degree and at least three years of project management experience, with 4,500 hours leading and directing projects and 35 hours of project management education.

- A secondary diploma with at least five years of project management experience, with 7,500 hours leading and directing projects and 35 hours of project management education.

The exam has 200 multiple-choice questions and is four hours long. You previously had to answer 61% of the questions correctly to pass. The current criterion is complicated, but you can still think of it as 61% passing score.

You must earn 60 PDUs (professional development units) over a three year period to continue to hold your certificate. PDUs are earned by developing your knowledge of the project management or helping others develop their knowledge. Attending or teaching project management courses and reading or writing project management books are samples of professional development.

1.4   What is a Project?

PMBOK Guide is only used for projects, so you need to know what a project is. This is the formal definition of the "project" in the PMBOK Guide:

A Project is a temporary endeavor undertaken to create a unique product, service or result.

If you are dealing with a work which is not temporary and does not create a unique product, you cannot call it a project and project management methodologies will not be useable in this work.

If you have more than one project in your organization, you will probably need program or portfolio management knowledge too. The PMBOK Guide deals with a single project.

1.5   What is Project Management?

PMBOK Guide defines project management as:

Project management is the application of knowledge, skills, tools, and techniques to project activities to meet project requirements.

However, the easiest way to understand the real meaning of the project management is to understand the whole PMBOK Guide. All that you read in the standard is part of the project management and everything you do not find in the standard is probably not part of project management. For example, being the best expert in project application area and being able to check every technical aspect of the project is not part of the project management. If you, as a project manager, are involved in the technical aspects, you are actually playing two roles: a project manager and a technical expert. You should also be aware that project management is crucial for the success of the project. If you spend most of your time on technical aspects and do not pay enough attention to your project management responsibilities, your project will probably fail.

2 Processes

2.1 The Concept of the Processes

You need to do many different tasks to manage a project. These tasks are organized by *processes* in the PMBOK Guide. Reviewing the processes is the best way to understand the meaning of the project management in terms of the PMBOK Guide.

There are 42 processes in the fourth edition of the PMBOK Guide; 42 packs of tasks which are enough and usually necessary for managing any project. It is the responsibility of the project manager and the project management team to do the following:

- **Selecting the processes needed for the project** – some of the processes are optional and you should decide on which ones to use. Using each process consumes time and effort and it is better not to use them in order to keep things simple, unless you really need them. Be careful in your selection, most of the processes are not optional.

- **Tailoring the processes for the project** – PMBOK Guide tells you a lot about each process, but this information is not enough for running processes in the real world; you should define all the details and methods you are going to use. This is why having the PMBOK Guide at hand is not enough for success; you will always need a qualified project management team.

2.2   The Relationship Among Processes

Each process requires some inputs (things you need to have before starting the process) and some outputs (results of the process). In order to produce outputs, you need some tools and techniques. Figure 2.1 shows a sample presentation of a process of the PMBOK Guide.

Inputs	Tools & Techniques	Outputs
.1 Project scope statement .2 Requirements documentation .3 Organizational process assets	.1 Decomposition	.1 WBS .2 WBS dictionary .3 Scope baseline .4 Project document updates
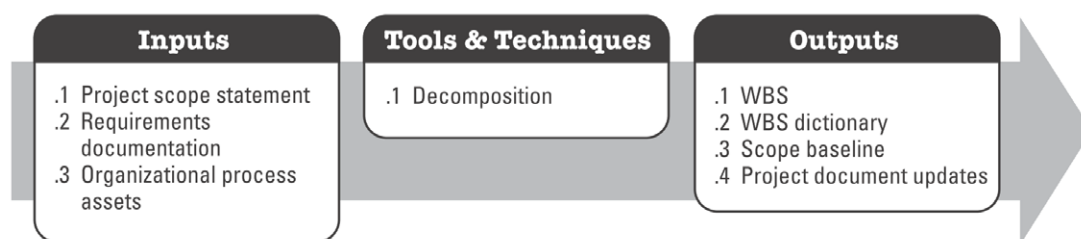
Figure 2.1 - a sample presentation of a process of the PMBOK Guide

This is the *Create WBS* process. You cannot create your WBS, unless you have three major inputs: the Project Scope Statement (a document that tells you about the scope of the project), the Requirements Documentation (a higher-level document that tells you about the requirements which shape the product and project scope) and the Organizational Process Assets (the methods, templates, procedures and information you already have in your organization).

So, we know that some inputs are needed for starting each process; where do they come from? Most of them are outputs of other processes. For example, Requirements Documentation is the output of the *Collect Requirements* process. This means that we have a relationship between these two processes (figure 2.2).

| Collect Requirements | → | Create WBS |

Figure 2.2 - a sample relationship between two processes

Download free eBooks at bookboon.com

Most relationships are two-way. You need to run the Collect Requirements in order to be able to run the Create WBS process, but the latter may raise issues which make us run the first process again, change the requirements documentation and return to the second process Another example: when you plan the costs, some cost-related risks are found (for example, you need a lot of money in a short period in the future and you might not be able to prepare it), so you will have to run risk processes and plan them. Risk responses might change your cash-flow, so you will have to run the cost processes again.

Two-way relationships create iterations. Most processes and especially the planning processes are iterative; you run them many times, until you end up with an appropriate set of plans.

2.3   Processes as Sets of Tasks

Each process is a set of tasks. Look at the *Create WBS* process (figure 2.1) once more. This process creates the WBS, but it is not the only thing it does; it also creates the WBS Dictionary and the Scope Baseline and it might change some other documents. Each process is a set of related tasks that are usually done at the same time, need the same inputs and create related outputs. Packing these tasks in a concept named *process* is a way of organizing and simplifying things.

If you check the older versions of the PMBOK Guide or the new draft of the fifth edition, you will realize that the number of processes is always changing (figure 2.3).
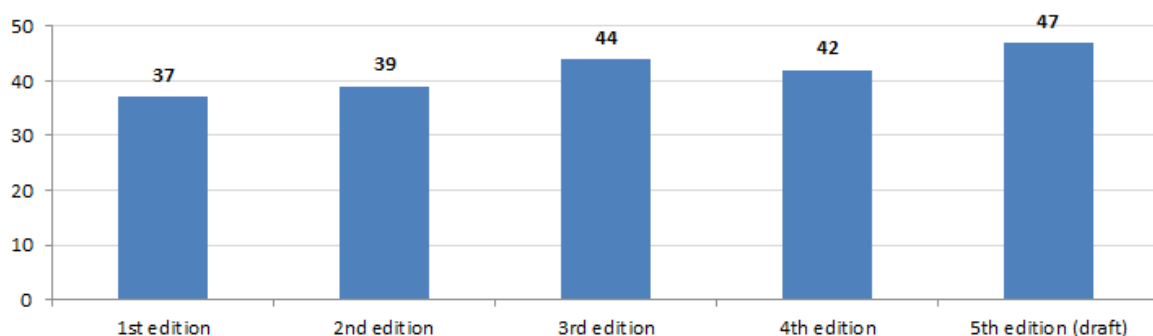
Figure 2.3 - the number of processes in different editions of the PMBOK Guide

These changes do not necessarily mean that tasks are added to or deleted from the standard; it usually means that tasks are organized in a new way, which is simpler to understand and implement.

2.4   Organizing the Processes

Processes are used to organize the project management tasks, but it is still hard to remember and understand 42 processes. What is the best way to overcome this problem? The first solution is always grouping. That is the same tool used for project activities when we organize them with Work Breakdown Structure (WBS).

The PMBOK Guide uses two kinds of grouping based on the following:

- Process groups
- Project management knowledge areas

We gain two different kinds of understanding from each of them. We would be able to understand the whole standard with the help of these two groupings, even without going into details.

Table 2.1 shows all processes grouped by knowledge areas and process groups. This table is similar to "Table 3-1" of the PMBOK Guide.

Table 2.1 – Processes, Process Groups, and Knowledge Areas

	Initiating	Planning	Executing	Monitoring & Controlling	Closing
Integration	• Develop Project Charter	• Develop Project Management Plan	• Direct and Manage Project Execution	• Monitor and Control Project Work • Perform Integrated Change Control	• Close Project or Phase
Scope		• Collect Requirements • Define Scope • Create WBS		• Verify Scope • Control Scope	
Time		• Define Activities • Sequence Activities • Estimate Activity Resources • Develop Schedule		• Control Schedule	
Cost		• Estimate Costs • Determine Budget		• Control Costs	
Quality		• Plan Quality	• Perform Quality Assurance	Perform Quality Control	
Human Resources		• Develop Human Resource Plan	• Acquire Project Team • Develop Project Team		
Communications	• Identify Stakeholders	• Plan Communications	• Distribute Information • Manage Stakeholder Expectations	• Report Performance	
Risk		• Plan Risk Management • Identify Risks • Perform Qualitative Risk Analysis • Perform Quantitative Risk Analysis • Plan Risk Responses		• Monitor and Control Risks	
Procurement		• Plan Procurements	• Conduct Procurements	• Administer Procurements	• Close Procurements

Download free eBooks at bookboon.com

3   The Process Groups

3.1   Knowing the Process Groups

Process groups are one of the two organizing structures used for processes. These are the five process groups in the PMBOK Guide:

- Initiating   (2 processes)
- Planning   (20 processes)
- Executing   (8 processes)
- Monitoring & Controlling   (10 processes)
- Closing   (2 processes)

The initiating group is a set of processes which start the project management and the project itself by doing some of the most important, basic and essential things.

The planning group prepares all the plans. The executing group executes all the plans and the monitoring & controlling group checks to see the results of the executing group, compares it to the plans and issues change requests whenever needed.

Download free eBooks at bookboon.com

Finally, the project is not completed by finishing all the project activities; it is only completed after doing some final project management tasks that are organized in the closing group. You should also run the closing group when you are going to terminate the project.

Now let us prepare a timeline for these process groups. I highly recommend that you draw the timeline based on your own expectations and experiences at the moment and then compare it to the figures in this book.

Most people expect the process groups to follow the timeline shown in figure 3.1.
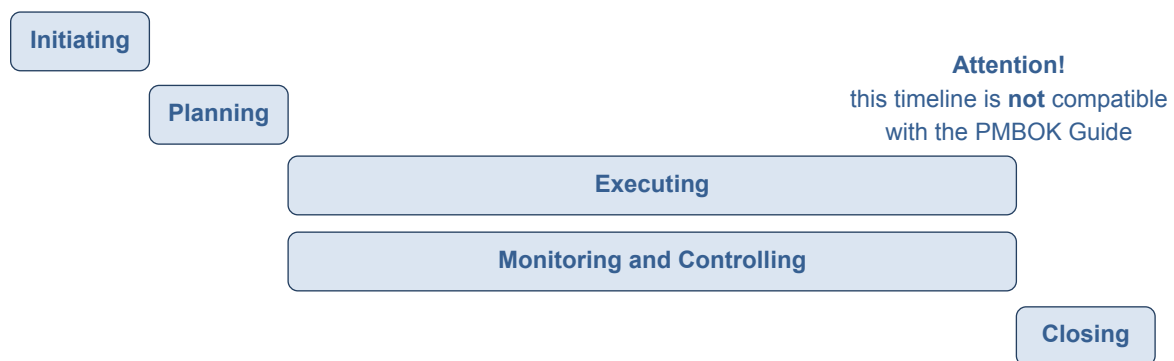
Figure 3.1 - a sample timeline for process groups (not compatible with the PMBOK Guide)

This timeline is not accurate and is not compatible with the PMBOK Guide. We will first discuss some concepts and then we will return to the timeline and correct it.

3.2   The Planning Concept

Have you ever been assigned to a work and started working right away? Well, that is not acceptable! Any kind of work needs a plan, especially a project. This is my favorite project planning quote:

> If I had eight hours to chop down a tree, I'd spend six sharpening my axe.
>
> Abraham Lincoln

You have to be proactive to be able to maximize your success and it is not possible to be proactive, without planning. It is not limited to the projects; it also governs other aspects of our lives.

If I were supposed to brief the PMBOK Guide in one sentence, this would be it:

> PMBOK Guide in one sentence: be proactive.

Let us review some examples.

Proactivity Example 1

You are working in a construction site and suddenly something terrible happens: one of the workers falls from a height and dies immediately.

This is an accident, but being an accident does not mean that you have nothing to do with it. Could you foresee this problem before the executing? Could you have responded with some extra activities, like building temporary handrails?

This is risk management; dealing with uncertain future events. We do not want to be reactive; we do not want to wait until something happens and then try to recover it; we should be proactive: foresee the problems and control them from the beginning. We need a plan to do that.

Proactivity Example 2

The project is executing and you realize that two of the recent electrical drawings have problems. You tell your electrical engineer that his drawings have errors and that he should correct them. He spends a week correcting the problem and now it is fine. You are all happy and continue the works of the project.

What is your opinion about this scenario?

This is reactive; this is wrong! You might end up with lots of failed projects if you act like this. You just saw the problem and ordered for correction. You will then wait for the next problem to arise and order again; it is reactive.

Here is what you should do:

- Find the root cause of the error in the drawings; why did he have problems in his drawings? He might have some minor problems with his work environment, with his tasks, or with his co-workers, that you can easily solve and avoid future problems.
- Solve the real problems (the root cause)
- Now you have the final step, which is not as important as previous ones: correct the current defect.

This would be the real project management! Anyone can order, and finding workarounds are not usually that difficult. The art of project management is foreseeing the problems and avoiding them beforehand: being proactive.

3.3   The Executing Concept

In order to be proactive, we need to plan everything and executing will be nothing but doing the plans; as in "plan the work, work the plan."

Sometimes you cannot continue running the same old plan because of reasons like these:

- A scope change has been approved, so you will have new activities and some old activities might need to be changes or be removed.
- You realize that your initial plan had problems, or is not as good as it should be and it is not rational to continue executing it.
- You have a new idea: you have realized that you can use another technique or equipment for a part of work and do it in a much better way; it is not acceptable to stick to the first idea you had.
- You were supposed to work as planned, but you are behind schedule, over budget, etc. Reports show that you might fail if you continue the project as you are doing it now. What would you do? Continue executing the plan and fail or revising the plan and trying to be successful?

We have to revise plans all the time. That is why we should change the previous timeline (figure 3.1) to what is shown in figure 3.2.
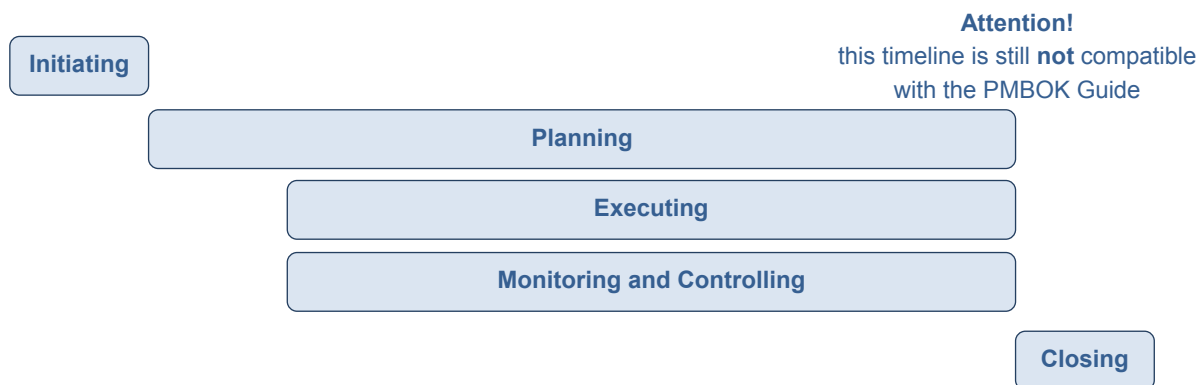
Figure 3.2 - a sample timeline for process groups (still not compatible with the PMBOK Guide)

This new timeline is much better. It now reflects the fact that we have to continue planning as long as executing takes place; however, there is still another missing point: When should we start executing?

We should not start executing until the first complete version of the plan is issued and approved. That is why I prefer to draw the timeline as shown in figure 3.3.
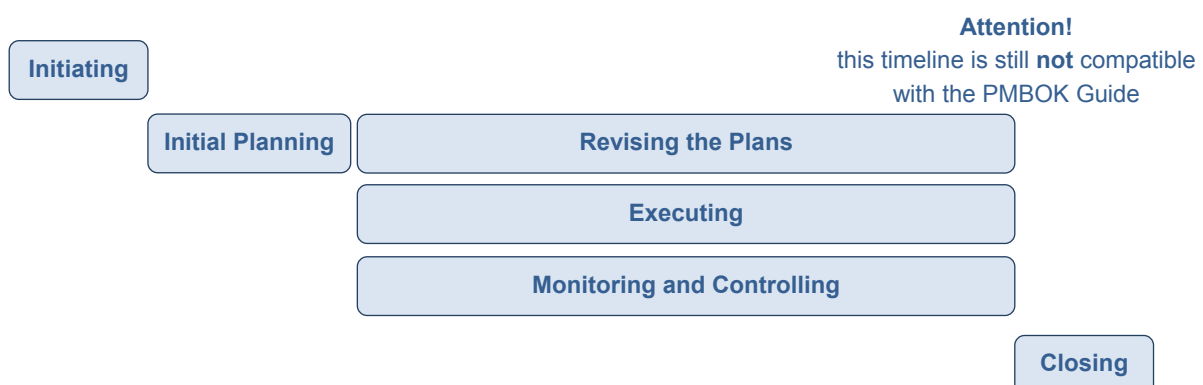
Figure 3.3 - a sample timeline for process groups (still not compatible with the PMBOK Guide)

We prepare the complete plan and then start (1) executing, and (2) revising the plan.

3.4   The Initiating Concept

Initiating is almost like planning; we need to revise it once in a while, but it is not revised too often. You can imagine initiating iterations mostly as reviewing and revising the business case. Is the project still feasible? Do we have to change some major strategies or requirements?

Figure 3.4 is revised to reflect the complete initiating timeline.

Initiating	Iterations of Initiating

Initial Planning	Revising the Plans

Executing

Monitoring and Controlling

Closing
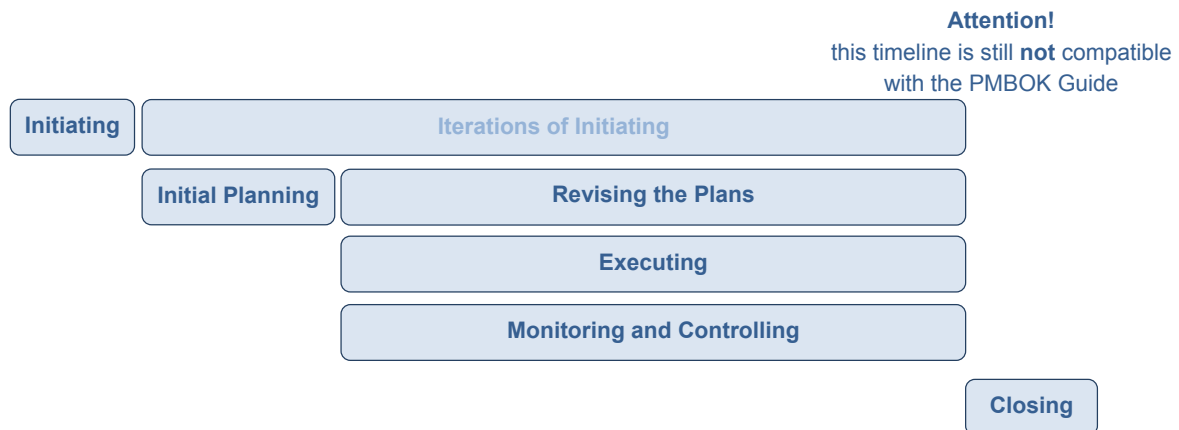
Figure 3.4 - a sample timeline for process groups (still not compatible with the PMBOK Guide)

The "iterations of initiating" bar is shown faded, because it does not happen too often.

3.5 The Monitoring and Controlling Concept

The last major correction we need in our timeline is about monitoring and controlling. This process group is mainly focused on executing, but it also monitors and controls planning and initiating tasks.

The other minor correction is that the closing process group overlaps the other process groups. Figure 3.5 shows the corrected and final timeline of the process groups.

Initiating	Iterations of Initiating

Initial Planning	Revising the Plans

Executing

Monitoring and Controlling

Closing
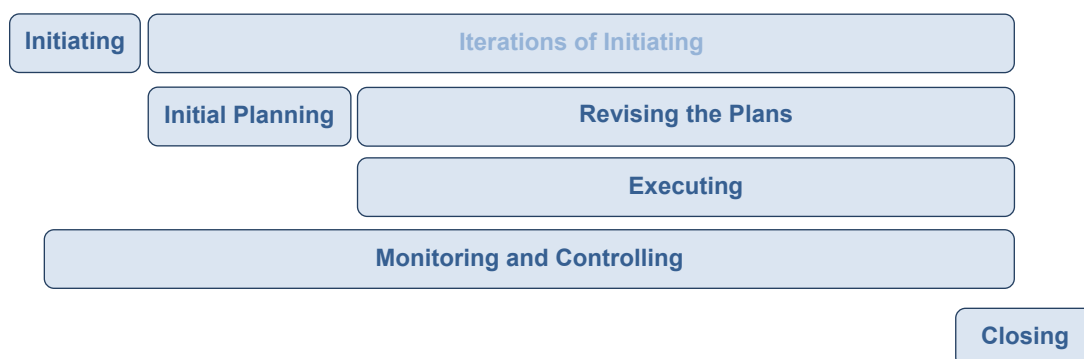
Figure 3.5 - schematic timeline of the process groups

I recommend you to have this diagram in mind when reading the rest of the book.

3.6 The Rolling-Wave Planning

As explained before, you need to have a complete plan before executing the project. This has to be complete, but it is not necessary to be detailed.

Sometimes you do not have enough information at the beginning of the project and therefore, it is impossible to plan the whole project in detail. An example is a design-build project, where you cannot plan the construction in detail when you have not designed it yet.

In these cases, you still have to prepare a complete plan for the whole project, but you can leave details for the future. You just plan the near future in great detail and start the work. You should always be careful to plan the details of each time-period before it begins. This kind of planning is called rolling-wave. Figure 3.6 shows the schematic timeline of rolling-wave planning.

High-level planning	Revising the high-level and detailed plans

Detailed Planning of Period 1	Executing Period 1

Detailed Planning of Period 2	Executing Period 2

Detailed Planning of Period 3	Executing Period 3
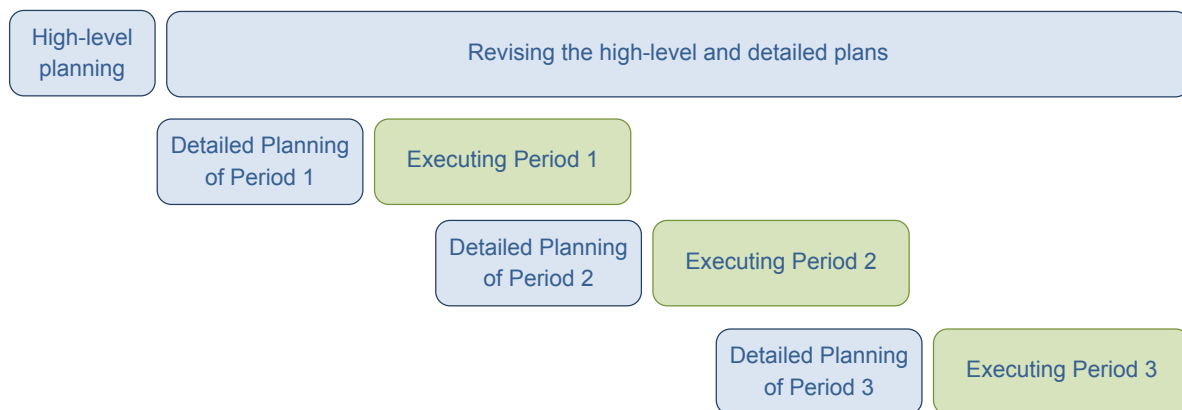
Figure 3.6 - schematic timeline of rolling-wave planning

Having a detailed plan is more effective, so you should avoid rolling-wave planning if you can.

Finally, I am going to remind you of the two necessary requirements in rolling-wave planning which are often misunderstood:

- You should still have a "complete plan" for the whole project, even though it is not detailed.
- You should plan details of each time-period "before" that period begins.

Imagine the design-build project. If you only plan the design and leave the construction without a plan, it would not be rolling-wave planning and it would not be compatible with the PMBOK Guide.

3.7   The Project Phases

An efficient way of managing some large projects is to divide it into phases. Phases are usually sequential, but they sometimes overlap a little.

Some people freely use the term "phase" for any division of the project based on time, which is not compatible with the PMBOK Guide. Each phase should produce a major deliverable. Deliverables are elements of the final product or result of the project. Deliverables should be unique and verifiable. Major deliverables are usually subject to approval by the client.

When you divide a project into phases, you will have to run all the process groups for each phase. In other words, you should manage each phase as a project. You start by initiating the phase (here you should answer the most important question: is it still feasible to continue the project?), then planning, executing, monitoring and controlling, and finally closing. When you close a phase, the final accepted deliverable of the phase would be transferred to the next phase, which will be the main input for initiating the new phase.

As an example, imagine a design-build project for a building. You can divide it into the design phase and the build (construction) phase, as long as these two parts do not overlap too much. You start by designing and treat it as a project. The deliverable of this phase is the design package of the building. You will then start initiating the second phase based on the design package provided by the previous phase. So, design package shows that this building costs much more than our initial expectation, should we continue to build it? These kinds of questions are answered in initiating process group.

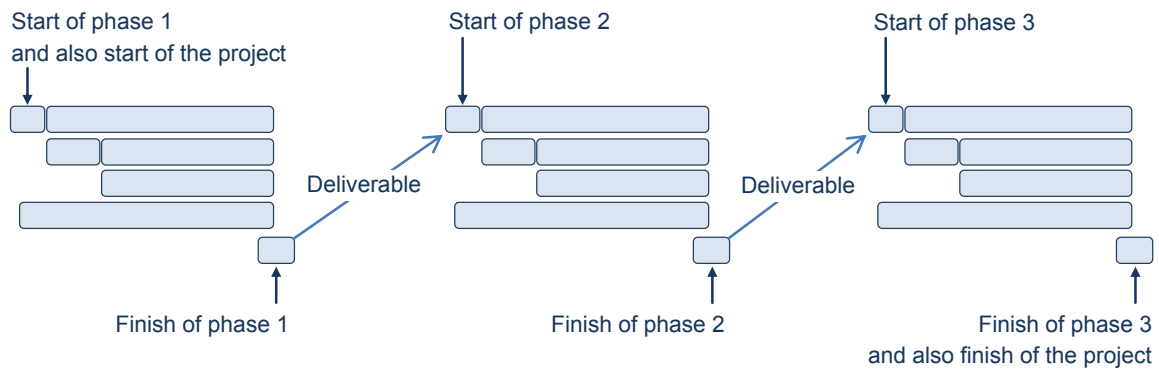The figure 3.7 shows process groups in a multi-phase project.

Figure 3.7 - process groups in a three-phase project

Even though you manage each phase like a separate project, it does not mean that you do not need any overall planning and control; you still need to have a complete (but not detailed) plan for the whole project. This plan will be detailed in every phase. This would be some kind of rolling-wave planning.

4 The Knowledge Areas

4.1 Knowing the Knowledge Areas

There are two grouping structures for processes, the process groups and the knowledge areas. The process groups and the concepts we learn from them have been explained before and now we are going to discuss the knowledge areas.

The knowledge areas are as follows:

- Project integration management   (6 processes)
- Project scope management   (5 processes)
- Project time management   (6 processes)
- Project cost management   (3 processes)
- Project quality management   (3 processes)
- Project human resource management   (4 processes)
- Project communications management (5 processes)
- Project risk management   (6 processes)
- Project procurement management   (4 processes)

The Draft of the fifth edition of the PMBOK Guide has a new knowledge area, called Project Stakeholders Management. This is not a major addition to project management tasks, but only a rearrangement of the old tasks in new processes and rearrangement of the processes in new knowledge areas. This book will explain knowledge areas based on the fourth edition of the PMBOK Guide.

There is one important thing I should explain now:

People engaged in EPC (Engineering-Procurement-Construction) projects usually ask "why is there a procurement knowledge area but no engineering knowledge area in the PMBOK Guide?" The so-called procurement knowledge area is about managing contracts which are used for purchasing in the procurement part of EPC projects and also in outsourcing and receiving services in both engineering and construction parts of EPC projects. In other words, there are two slightly different meanings for procurement, one that is used in the PMBOK Guide and one that you use in your EPC projects.

Another important thing is that the PMBOK Guide pays a lot of attention to integration. You can have the best people for every other knowledge area, but you will fail, unless you integrate them in a proper way. For example, you cannot manage time in isolations; it has many interactions and tradeoffs with other areas like cost, scope and risk. Integration is so important that the PMBOK Guide has created a knowledge area for it. Remember that integration is one of the most important responsibilities of the project manager and the project management team.

4.2   What Happens in Each Knowledge Area

There is a more or less similar story in each knowledge area. Each of them involves a special expertise and the PMBOK Guide treat them in the same way.

Here is the general template used for each knowledge area:

- The first thing is to prepare the management plan of that area. This task might have a process or not, but the management plan should be created. The management plan tells us how we are going to plan, monitor and control that area. For example, the schedule management plan (time knowledge) tells us what software we will use for scheduling, what time-periods will be used for control, what parameters will be used for evaluating the time performance and so on. The concept of the management plans is not obvious in the PMBOK Guide, but exists and governs the whole concept. Presence of these plans is cleared up a little in the draft of the fifth edition of the PMBOK Guide.
- The next step is planning the area's work. In the time management area, this step will be developing the time schedule.
- Having all the initial plans in hand, we can start executing the work. There might be some processes involved in executing, which show us the proper way of running work according to that area.
- Now we have to monitor and control the area. First, we should monitor the work according to that area; in case of time management knowledge area, we should check to see if we are performing according to schedule. We should also forecast the future; where will we end up if we perform like this? The monitoring information is used for control. We will request preventive and corrective actions. All change requests go to the *Integrated Change Control* process and in case of acceptance, they will be reflected in the plans and the execution will always follow the plans.

What you should always have in mind is that we have two different plans for each knowledge area: a management plan and a work plan ("work plan" is not a PMBOK Guide term). Figure 4.1 shows the interactions between these two plans.
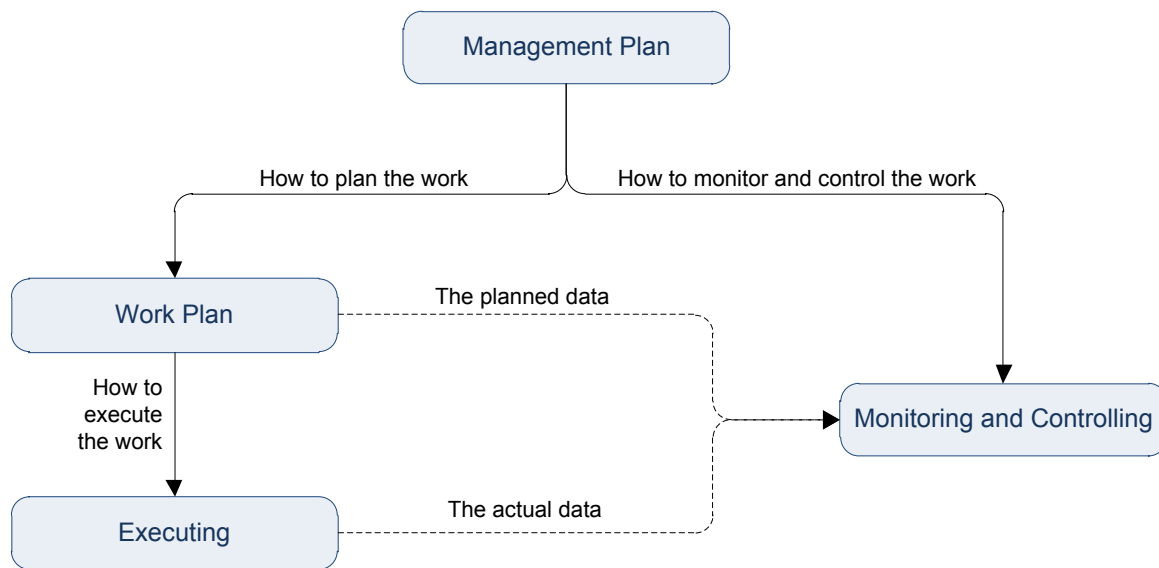
Figure 4.1 - the role of the management plans and the work plans in each knowledge area

The change concept is not shown in previous figure to keep it simple. The Figure 4.2 shows this concept.
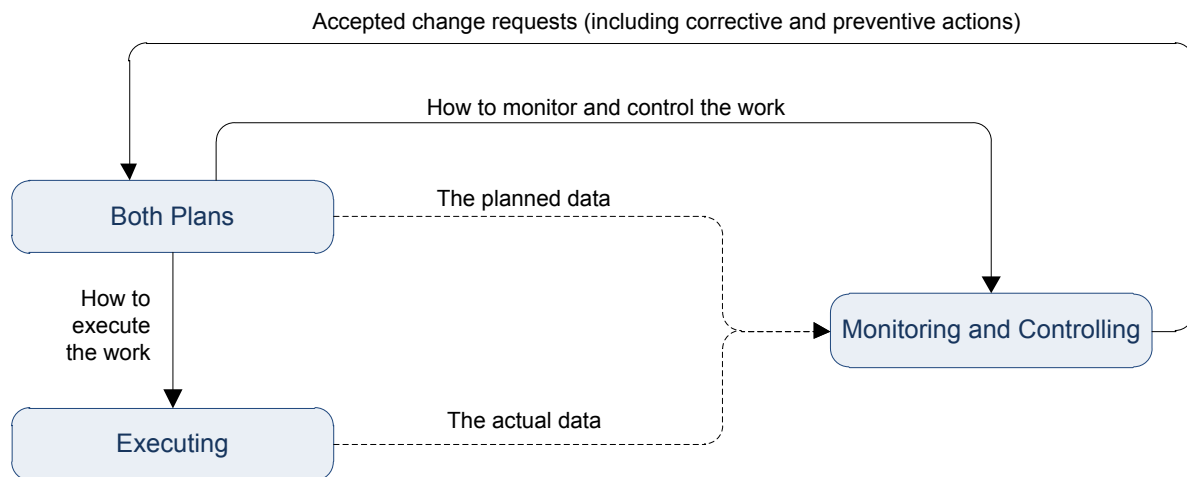
Figure 4.2 - the change concept

The main output of the monitoring and controlling processes is the change requests. These processes receive planned and actual data and analyze them; if something is not in place, a preventive or corrective action will be created and issued as a change request. The accepted change requests will be applied to the plans and they would be implemented in execution because execution always follows plans.

Now that you know the general structure of the knowledge areas, we can review them one by one and discuss the nature of each of them.

4.3   The Project Integration Management Knowledge Area

No matter how many qualified experts you have on your team, you will not be successful, unless they actively interact with each other. You can never manage a knowledge area in isolation. The integration concept is so important that the PMBOK Guide has a whole knowledge area for it.

The six processes in this area and their process groups are as follows:

- Develop Project Charter   (Initiating process group)
- Develop Project Management Plan   (Planning process group)
- Direct and Manage Project Execution (Executing process group)
- Monitor and Control Project Work   (Monitoring and Controlling process group)
- Perform Integrated Change Control   (Monitoring and Controlling process group)
- Close Project or Phase   (Closing process group)

This is the only knowledge area that has processes in all process groups.

Planning the Integration

Project formally starts by project charter and preparation of this short, yet important document is done in the integration area; because project charter involves all knowledge areas.

We should add all of the important initial information in the charter, usually including a rough explanation of the scope, budget, high-level risks, and the name of the key stakeholders. Project manager is normally assigned by this document. Whenever you want to know a project, the first step is reading the project charter.

There is a role in the PMBOK Guide, named project sponsor. This person is usually an executive who initiates the project, prepares the budget and supports it at a high level. The project sponsor is not involved in the day to day business of the project manager. The project manager usually reports to the project sponsor.

The project charter and the concept of formally starting a project need a high level of authority which is above the project manager; it is project sponsor's responsibility to approve the charter and authorize the project.

Each knowledge area produces a management plan and a work plan. Work plans usually update and we need a static image of their initial state in order to compare them with the current actual state. The static initial state of each plan is called the baseline. The initial planned costs are named cost baseline, the initial time schedule named time baseline or schedule baseline, and so on.

You should integrate knowledge areas by collecting all management plans and all baselines; this package is called the project management plan.

All the remaining documents produced in other knowledge areas that do not fit into the project management plan will be put in another package, which is simply called the project documents.
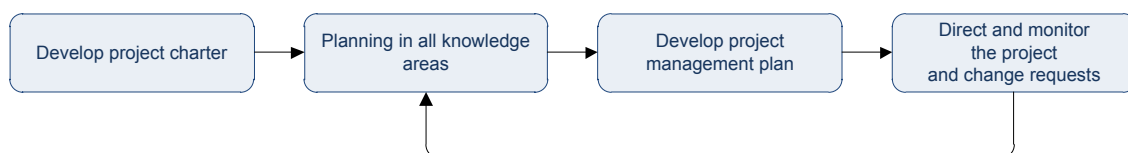
Figure 4.3 shows a simplified integration management.

Figure 4.3 - a simplified integration management

Directing and Controlling the Whole Project

The execution of the whole project should be directed by the project management plan. We should collect all plans and baselines; that is why this process happens in the integration area.

We should monitor the project in pre-defined time periods. Duration of control periods should be mentioned in the project management plan. Figure 4.4 shows the monitoring concept.

```
 ┌──────────────┐                              ┌──────────────────┐
 │ Planned data │                              │ Current state and │
 └──────────────┘                              │    variations     │
                     ┌────────────┐            └──────────────────┘
                     │ Monitoring │
                     └────────────┘
 ┌──────────────┐                              ┌──────────────────┐
 │ Actual data  │                              │    Forecasts     │
 └──────────────┘                              └──────────────────┘
```
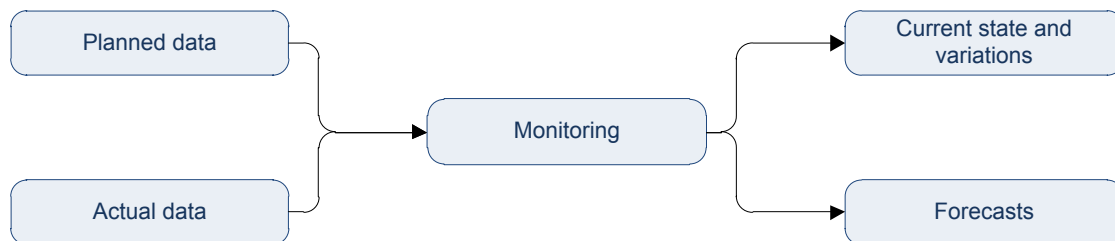
Figure 4.4 - the monitoring concept

Planned data comes from the project management plan and particularly its baselines. Actual data is reported from the executing and monitoring processes. We should analyze them and create two outputs:

- Current state of the project and variations: e.g. we are ahead of schedule, but over-budget, the quality is within control limits, etc.
- Forecasts: monitoring is not complete without forecasts, because your current state might be suitable, but forecasts show that you will have problems in the future, unless you prepare an appropriate preventive action.

The two outputs of monitoring are used for controlling the project. We should be proactive, so corrective actions are never enough and we should also focus on preparing preventive actions.

Corrective actions and preventive actions are changes; each change request should be sent to the Integrated Change Control process. This process should evaluate all aspects of each change and decide on it. Approved changes will be applied in plans. Figure 4.5 shows the *integrated change control*'s concept.
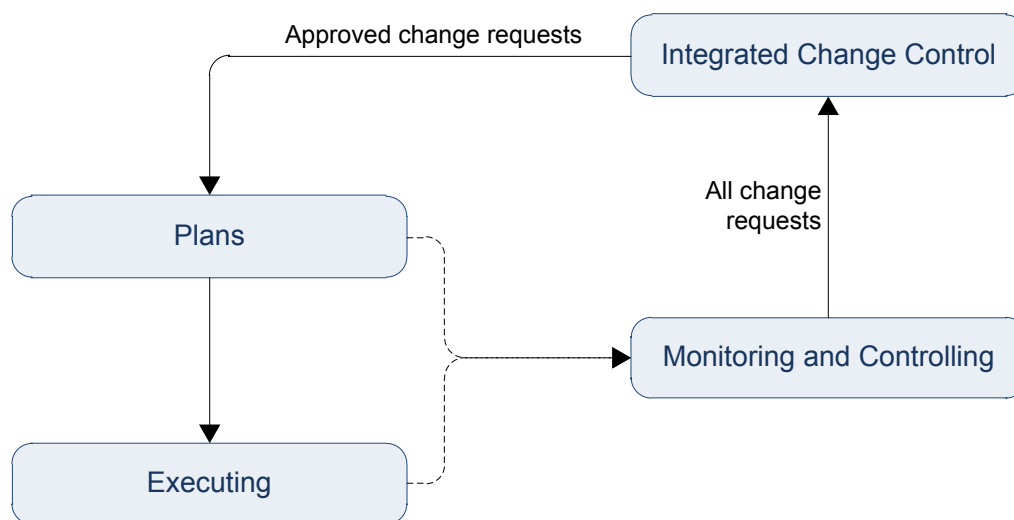

Figure 4.5 - the integrated change control's concept

No changes will be applied in plans, unless they are approved in *integrated change control*. This actually means that we should not apply any changes, unless we evaluate it based on every aspect of the project, not by limited factors like time and cost.

Project phases are managed like single projects and all the process groups will be used for each of them; that is why the final process is called *Close Project or Phase*; it is used for closing both the project and the phase.

We should close terminated projects as well as finished projects. We should get the formal acceptance of the project (unless it is terminated), archive documents, evaluate client's satisfaction, finalize lessons learned, etc.

4.4   The Project Scope Management Knowledge Area

So, you have an authorized project in hand and you want to start the project, but what exactly is this project? What are the specifications of the final product? What deliverables should you create? The project scope management deals with all of these questions. We should define the scope by defining what is included in and what is excluded from the project.

The project scope management knowledge area consists of the following processes:

- Collect Requirements   (Planning process group)
- Define Scope   (Planning process group)
- Create WBS   (Planning process group)
- Verify Scope   (Monitoring and Controlling process group)
- Control Scope   (Monitoring and Controlling process group)

Planning the Scope

The first thing you should do in every knowledge area is to create its management plan. Scope management starts with developing the scope management plan; this document shows how you will plan and control the scope. WBS coding templates, the details involved defining the scope, how you will get approval for the scope, and whether you will use product breakdown structure or not are all answered in this document.

We have many intermediate products when we plan the scope, but the main output is Work Breakdown Structure or WBS for short. WBS is one of the most important planning outputs, because:

- It is used in almost all other knowledge areas; for example, you cannot prepare a time schedule without a WBS, it is too hard to plan risks without WBS, etc.
- All planning activities need collaboration, but the level of collaboration you need for creating WBS is at its highest level. If you create WBS in a proper way, you will create buy-in for the project team and the key stakeholders, which is invaluable.
- You should pay attention to team building; gathering people is not enough; you should create an environment suitable for team work. Creating the WBS can also be a team-building activity, especially because it is one of the first activities of the project.

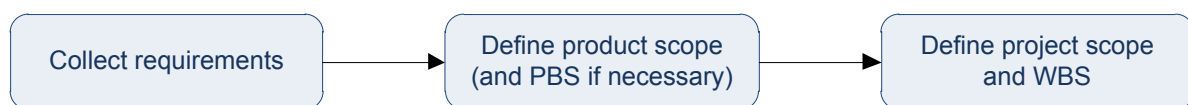Figure 4.6 shows the necessary steps for creating a WBS.

Figure 4.6 - steps needed for creating a WBS

You should start by collecting the requirements. Requirements define some of the most important (but not all) characteristics of the product. We need a process plant to produce a specific amount of product with a specific amount of material and energy; this would be a sample of requirements.

You should then analyze the requirements and add to them, in order to define product scope. Product scope is a complete image of the final product. You may prefer to create a Product Breakdown Structure to improve this step, but it is not necessary.

You may wonder what the difference between product scope and project scope is. The difference is shown in figure 4.7.
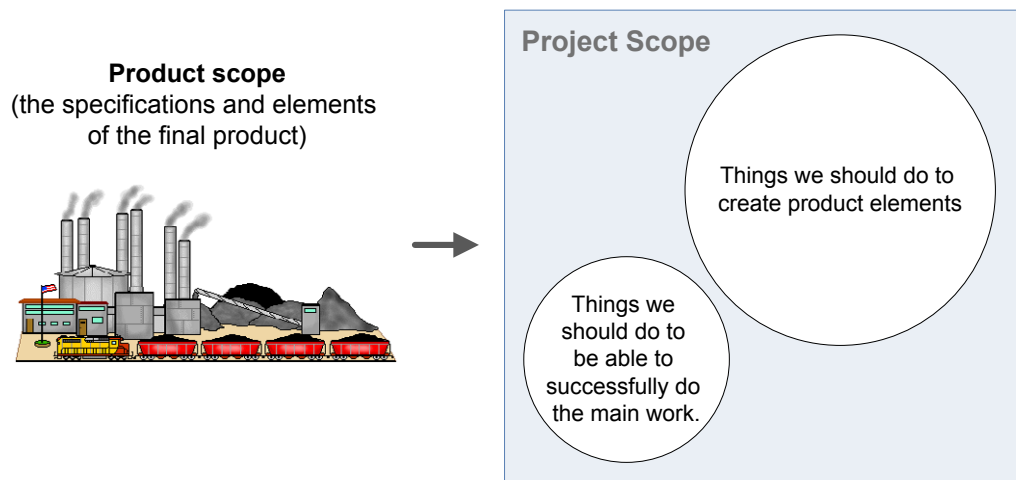

Figure 4.7 - difference between product scope and project scope.

As you can see in the figure, the main difference between product scope and project scope is the extra work we should do in order to be successful in the project. For example, we decide to build temporary handrails in heights to avoid accidents and design some additional steps for some activities to gain higher quality and avoid reworking; they will add new activities and deliverables into the project, but they do not belong to the final product.

Many of the extra things we need come from other knowledge areas like risk; so we should prepare the first edition of the WBS in order to be able to start risk planning and then use risk planning outputs to revise the WBS, if needed.

What is the difference between project scope statement and WBS? WBS is a hierarchical form of project scope. Using the hierarchy helps us understand it, improve it and use it in a productive way.

Every WBS should be accompanied with another document called WBS Dictionary. The latter describes each WBS element and makes it easy to understand the real meaning of each of them. WBS, WBS dictionary and the scope statement are called scope baseline. Scope baseline is our scope target and we will compare the actual performance with it all the time.

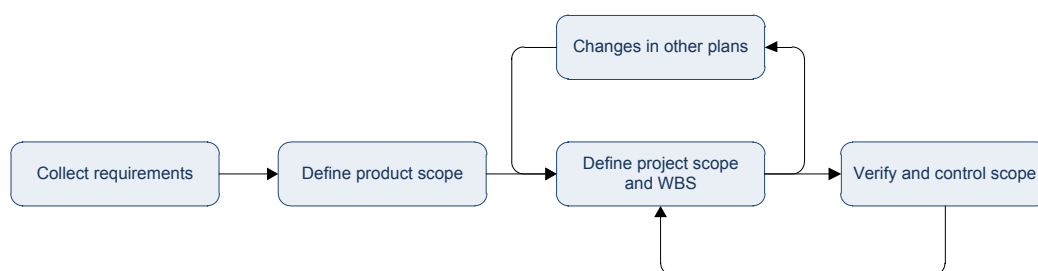Figure 4.8 shows a simplified scope management.

Figure 4.8 - a simplified scope management.

There are two rules you should follow to have a well-formed WBS. These rules are as follows:

- **WBS should be based on deliverables**: you should always focus on products instead of work to be successful. Deliverables are unique and verifiable pieces of the final products and your WBS should arrange them instead of the work. The works needed for each deliverable may change according to the technology and procedures you will use, but deliverables do not change that often. It does not matter how much work you do, the amount of deliverables count. Imagine a construction project; if you choose "first month's work", "second month's work" and so on as the first level of WBS, it would not be deliverable based. If you choose "making concrete", "preparing reinforcements", "preparing formworks" and so on, it would not be deliverable based either. If you choose "basement", "first floor", "second floor" and so on, that would be a deliverable based WBS. Using the responsibilities, departments, process groups and any other concept is not allowed in WBS; you should only use deliverables.
- **WBS should follow the 100% rule**: the sum of all the children of a specific WBS element should be 100% of that parent. If you name a WBS element "electrical utilities", you should not have any electrical utilities elsewhere and nothing but the electrical utilities underlying it. The highest level of the WBS is the project and this element should also follow the 100% rule: you should not have anything less or anything more in it.

Monitoring and Controlling the Scope

When working on the project, you should always check the actual scope with the baseline to be sure that you do not miss any deliverable and you do not produce anything extra.

The specifications of each deliverable are also a part of the scope, so you should check the specifications. Some of the specifications deal with quality, which should be checked in its own knowledge area. Scope and quality monitoring and controlling usually go hand in hand.

4.5   The Time Management Knowledge Area

You will plan and control the time in the time management knowledge area. Here you will deal with schedules and time performance analysis.

Time management is done with these processes:

- Define Activities   (Planning process group)
- Sequence Activities   (Planning process group)
- Estimate Activity Resources (Planning process group)
- Estimate Activity Durations (Planning process group)
- Develop Schedule   (Planning process group)
- Control Schedule   (Monitoring and Controlling process group)

Time plan is what some people call project plan, which is wrong. Time plans are just one part of the whole project management plan and you should have many other plans besides that. You might consider the time plan as the core of the plans, which is hard to say if it is true or not, but you should always remember that all knowledge areas interact with each other.

Planning the Time

As usual, we should start by creating the management plan of the knowledge area. The management plan of this area is called schedule management plan. You should define the planning software, the activity codes' template, the control periods, the monitoring parameters, the scheduling methods, etc.

Planning the time is done with time schedules and you might already be familiar with the concept. There is one important thing in the PMBOK Guide which you should always remember: the difference between the schedule and the schedule model.

What you normally prepare in planning software, which includes activities, relationships, durations, calendars, resources and other scheduling elements, is called the schedule model. The schedule is a simple table of activities with starts and finishes. Schedules are periodically produced by the schedule model.

The distinction between schedule and schedule model is practical and important. Schedule model is a simulation of the project. It should have the potential to reshape appropriately based on every actual data and always return realistic schedules. The common problem is that people usually judge schedule models based on the schedule they are currently showing. You can have two completely different schedule models with the same current result, but with different qualities. One of them is capable of producing realistic schedules in every scenario, but the other one loses its power after a couple of actual updates. Discussing the characteristics of a high quality schedule model is impossible in this book. You can read my other free ebook, the Project Scheduling Rules (http://en.khorramirad.info/scheduling-rules-ebook/) to get familiar with quality factors of schedule models.

You receive the WBS and start time planning by defining the activities needed for each deliverable of the WBS. You continue by adding relationships, resources, durations, calendars and other scheduling elements. You will finally have a schedule model which is capable of producing schedules in different circumstances.

When the schedule model is completed and approved, you should save its current schedule as the time baseline. The actual performance will always be compared to this baseline in order to evaluate execution.

Figure 4.9 shows a simplified time management.
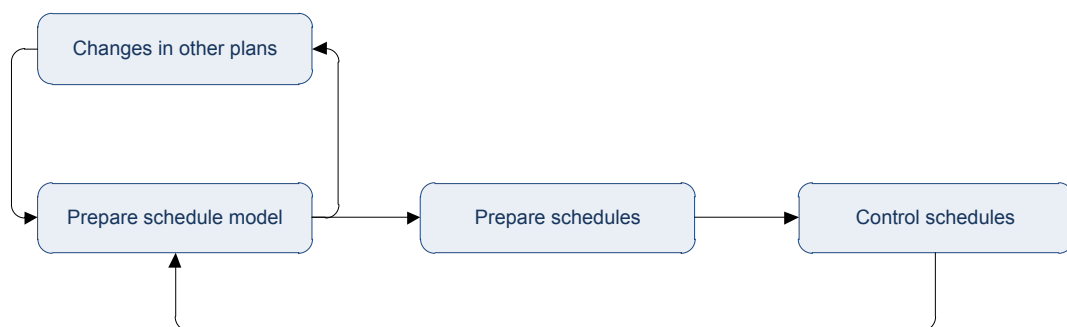
Figure 4.9 - a simplified time management

Most planning software is capable of planning other areas like cost and human resources and even risks besides the time. This is fine; it does not matter when and how you plan each of them, as long as you appropriately run the processes based on your management plans and the PMBOK Guide.

Monitoring and Controlling the Scope

You should track time performance in each control period according to your schedule management plan. The minimum data you should gather in each period is the actual start, the actual finish and the progress of each activity; the rest depends on your management plan.

By entering the actual data, you will have the actual performance; the planned values come from schedule baseline and by comparing them, variances are calculated. These variances and other monitoring parameters are used to create preventive and corrective actions. You might be behind schedule and be able to spend more money or change the executing procedures to correct it. You might even be ahead of schedule and realize that you can improve quality and reduce costs by slowing down.

Monitoring is not finished here; you should also forecast the future. Some potential problems will show up with this analysis and become another basis for control.

4.6   The Cost Management Knowledge Area

Projects normally have a limited and predefined budget and you should always manage your costs according to it. Your main purpose of doing the project is usually monetary benefits, but even if you are doing it to gain credit and knowledge in hope of profitable projects in the future, you still do not want to spend more than a specific amount of money, which is your defined budget.

Cost management is done with these processes:

- Estimate Costs   (Planning process group)
- Determine Budget   (Planning process group)
- Control Costs   (Monitoring and Controlling process group)

Planning the Cost

You should start by preparing the cost management plan. This plan shows how you will plan and control costs; the cost accounts, code templates, methods of estimating, responsibilities, monitoring parameters, control periods, etc.

After preparing the management plan, it would be time for planning the costs itself. You should define each activity's cost with the method specified in the management plan. You can use bottom-up or top-down methods, precise or rough estimates, or any other method or preference you chose in your management plan, based on the nature of your project.

After defining activity costs, you can aggregate them and define costs of each WBS element. You should add the contingency reserves and the result would be the cost baseline. You will then add management reserves and the result would be project budget (figure 4.10).
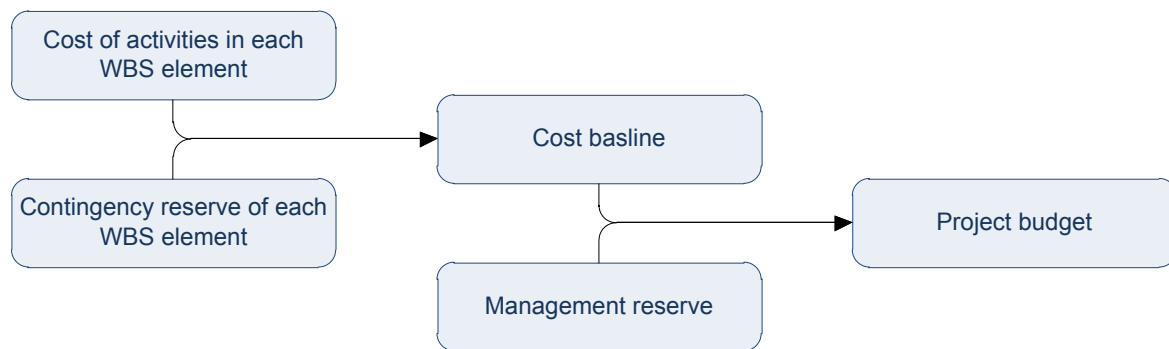
Figure 4.10 - defining project budget

You will later learn that there are three types of risks:

- The known and planned risks: response plans are added as new activities or into existing activities and their costs will be included in the activity costs.
- The known and unplanned risks: it is not efficient to plan all the risks. The amount of money you might need for unplanned risks is called contingency reserve.
- The unknown risks: you might not be able to identify all the risks, but you might still know that there are some unidentified risks. The amount of money you need for them is called management reserve.

Figure 4.11 shows a simplified cost management.
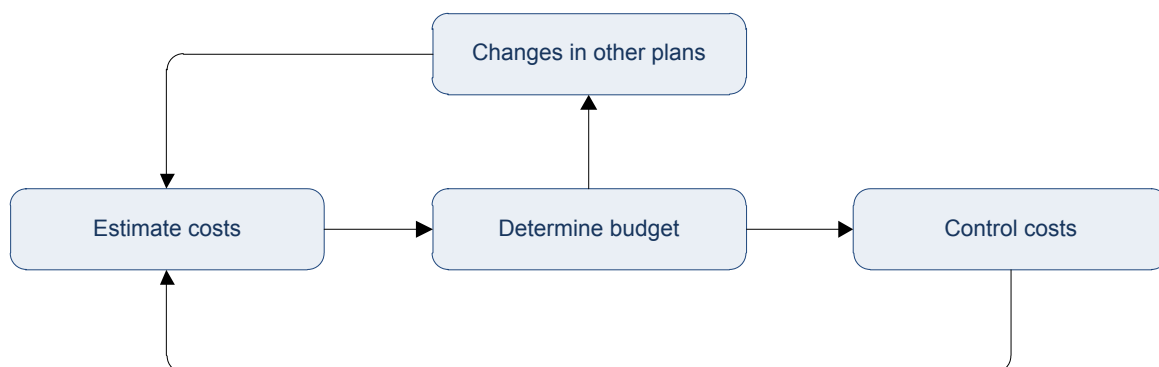
Figure 4.11 - a simplified cost management.

The total amount of costs is not the only planning output; you should also prepare the cash flow and check to see if it is realistic. Cash flow is the amount of money you need for each period of time and is calculated by the help of the time schedule. You might have enough budget for the project, but you cannot spend very high amounts in a very short time. In this case, you should level the costs (as you do with resources) by changing the schedule.

Monitoring and Controlling the Cost

You should analyze the collected actual cost information in each control period and compare it to the cost baseline. By doing so, the variances and other monitoring parameter will be calculated and you should remember, as always, to forecast the future. This information will be used to create corrective and preventive actions and keep the project on budget.
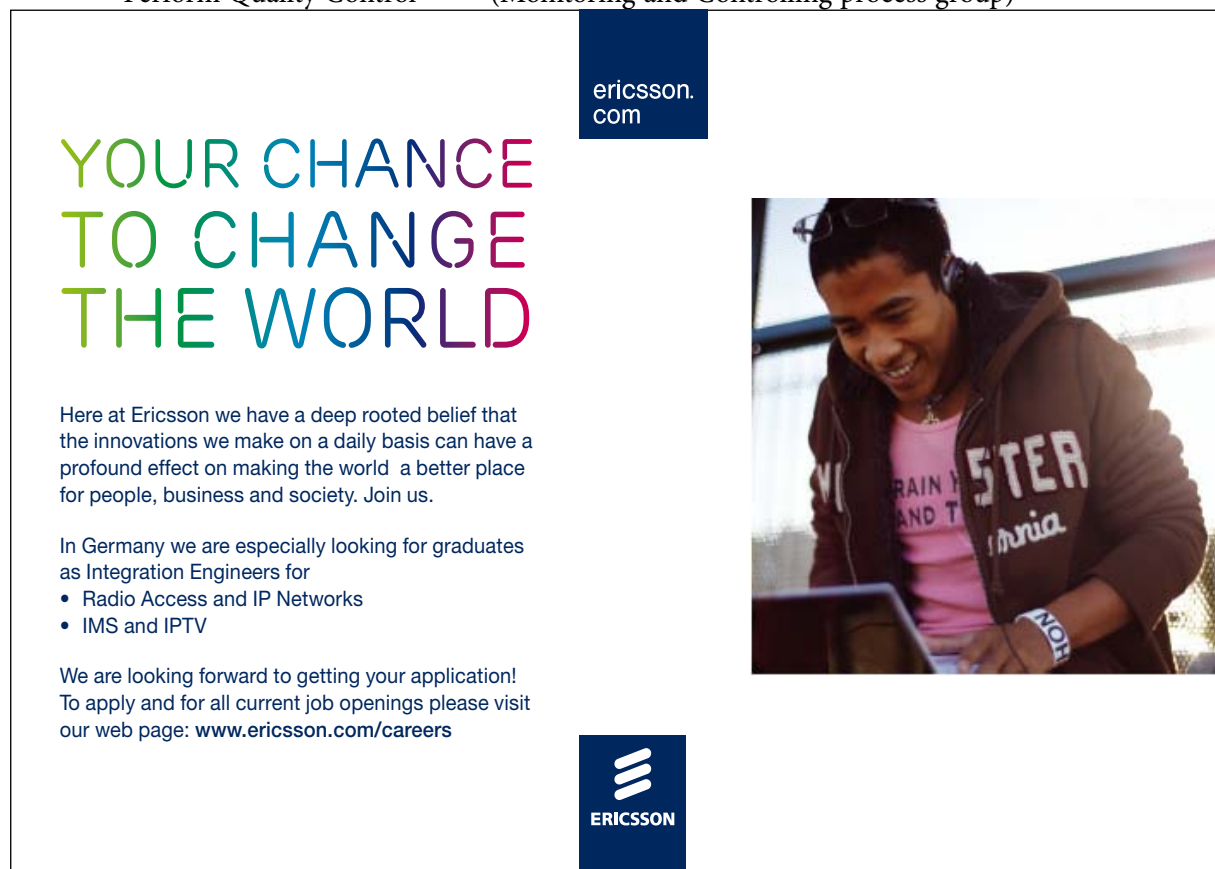
The corrective and preventive actions are issued as change request and should be evaluated in all knowledge areas before accepting or rejecting. In case of acceptance, all other knowledge areas' plans might change besides the cost plan.

4.7   The Quality Management Knowledge Area

Quality management, like every other aspect of the project management, should be proactive. Limiting the quality management to detecting defects is reactive. You should plan the quality and prepare an environment that does not create defects, instead of finding and repairing defects.

Quality is managed by these processes:

- Plan Quality   (Planning process group)
- Perform Quality Assurance   (Executing process group)
- Perform Quality Control   (Monitoring and Controlling process group)

Planning the Quality

Planning the quality is selecting all the codes and standards you have or want to use in your project to avoid defects and gain the defined level of quality. Existing codes and standards might not be enough in some cases and you will then have to prepare your own additional standards. They should be accompanied with procedures, checklists and other supportive documents. This will be called quality planning.

Some people believe that it is desirable to achieve the highest quality possible; which is not true. Each project needs a specific level of quality and going much above it would be a waste of resources. You should have a minimum and a maximum level of quality.

Quality tasks reduce the probability of defects and repairs, and reduce time and cost in this way; however, they do cost us money and time. You should find an optimum level of quality based on these contradictory parameters.

Figure 4.12 shows a simplified quality management.
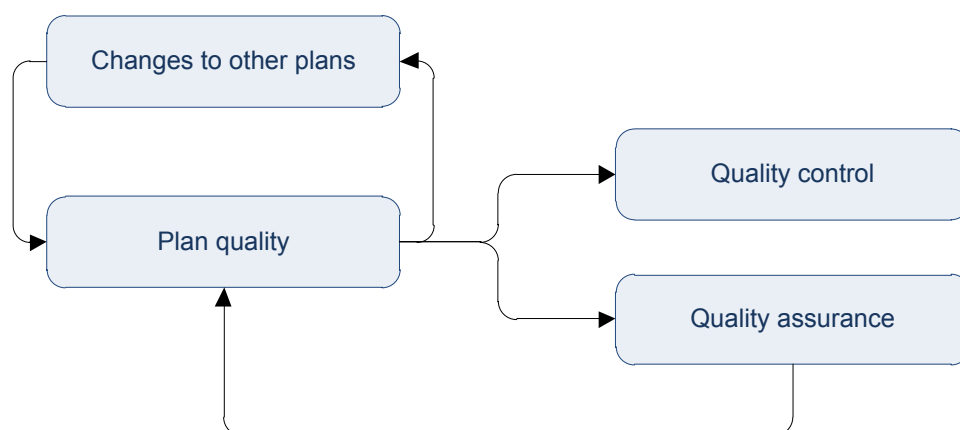
Figure 4.12 - a simplified quality management.

Monitoring and Controlling Quality

Quality control is not limited to detecting defects; the main purpose is to monitor the project for quality and check to see if executing is following the quality plan. By following the plan, you might have much fewer defects to repair.

You might follow the quality plan, but still have lots of defects. This might be because of an unsuitable quality plan. The Quality Assurance process is responsible to find these problems and request for changes in the quality plan.

4.8   The Human Resource Management Knowledge Area

After all, it is the human resources that directly or indirectly do the works. The project manager needs to pay enough attention to this area. Some of the project related aspects of human resource management is discussed in the PMBOK Guide, but you will also need to have many of the general management skills.

The project related aspects of human resource management is covered by these processes:

- Develop Human Resource Plan   (Planning process group)
- Acquire Project Team   (Executing process group)
- Develop Project Team   (Executing process group)
- Managing Project Team   (Executing process group)

You may wonder why there are no processes for the monitoring and controlling of the human resources. That is because the PMBOK Guide is only concerned with project related skills; monitoring and controlling the human resources is more of a general management skill. You might not even monitor and control human resources directly as a project manager as functional departments of your company are responsible for that.

Planning the Human Resources

We start by planning the human resources as usual. One of the most important things we should plan is the roles and responsibilities. You should always have clear roles and responsibilities assigned to have a successful project.

Roles and responsibilities can be a plain text document. You can also use hierarchical structures to organize the roles and responsibilities; the Organizational Breakdown Structure or OBS for short, describes the hierarchy of reporting. The Responsibilities Assignment Matrix, or RAM for short, is a chart you might want to use and make responsibilities clearer. It is common to link RAM and OBS to other entities of the project like WBS and RBS (Risk Breakdown Structure); because all WBS elements, activities and risk items need someone to be responsible for and to report on.

You should define the number, type and skill level of the human resources you need for the project. You can get some of the required data from the time schedule and produce the outputs. Human resources are not usually easy to acquire, so you should think of hiring and releasing people. Having the right people at the right time is not enough; they should be able to work as a team. What kind of team-building strategies will you choose? People need motivations; what is your system of recognition and reward? No matter how skillful they are, they might need some additional training; what trainings do you have in mind and how will you manage them? You are responsible for your staff; what is your plan for their health and safety?

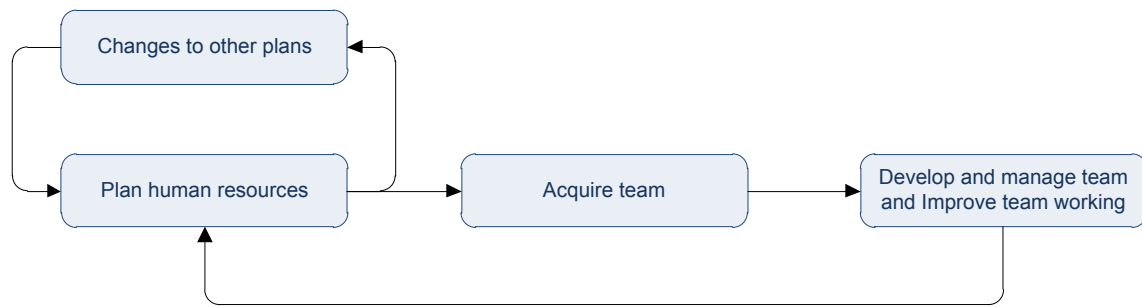Figure 4.13 shows a simplified human resource management.

Figure 4.13 - a simplified human resource management

This knowledge area interacts with others. You may request new activities (like training) to be added to the time schedule. Your acquiring, team-building activities, training and many other needs in this area cost money and they should be considered in the cost area. You may realize that it is not easy to find a specific skill when you need it and define a new risk item for that. You should also prepare the calendars (working times and availabilities), which is another input for the time area.

Executing the Human Resources

When you have a good plan, executing and managing would be so easy. You just have to work the plan.

Executing starts with acquiring the staff, increasing their teamwork abilities and motivating them, and then continues by resolution of their conflicts, leading them, mentoring them and finally, releasing them.

You might issue many change requests in this area. Imagine that you realize that some of the staff is not able to work as planned and you might need to consider new training, hire more people, replacement, and so on.

4.9   The Communications Knowledge Area

Project manager has to spend 80% to 90% percent of his/her time communicating; that is the key to success. If you do not have enough time for that, it is probably because you spend unnecessary time on other things that are not your main responsibility (like technical issues) or could have been delegated (like preparing a complete and detailed time schedule in a complicated planning software).

Communication is handled with the following processes:

- Identify Stakeholders   (Initiating process group)

- Plan Communications   (Planning process group)
- Distribute Information   (Executing process group)
- Manage Stakeholder Expectations   (Executing process group)
- Report Performance   (Monitoring and Controlling process group)

Planning the Communications

The initiating process group consists of two processes, including a communication process: *Identify Stakeholders*. This means that you should identify stakeholders as soon as possible. You should also pay attention and update stakeholder register regularly to reflect your newest knowledge and implement it to gain success.

Stakeholder is a person or an organization that has some level of interest in your project and can influence it. Suppose we are going to build a house; our construction might be noisy and disturb the neighbors. They are able to call the police or sue you in that situation and stop your work or cause problems for you. So, they should be in your stakeholders register and you should watch them, try to satisfy them and even try to get their support.

You should have a list of the stakeholders and enter all the relevant information: how they are connected to the project; how they are influenced by the project; how they can influence the project; how powerful and how interested or involved they are; and finally, how are you going to manage them, keep them satisfied and get their support. This document is called stakeholder register.

The most important aspect of managing stakeholders is keeping them informed. You should pay attention to distributing information. Each stakeholder needs specific types of information to be available in an appropriate way and time. Never forget that sending information or making it available for receivers to have is not enough; you should get their feedback to be sure that they have received it and understood it. Feedback also shows how effective your information is and if you need to improve it. Receiving feedback is a way of being proactive.

Meetings are also a way of communication and should be planned. They have potential for wasting time on inefficient subjects and you should fight it with appropriate planning. One effective communication tool is WBS. WBS is the common understanding of the project and interprets it, in a way suitable for everyone. This means that you should recheck your WBS if you have constant problems in communications.

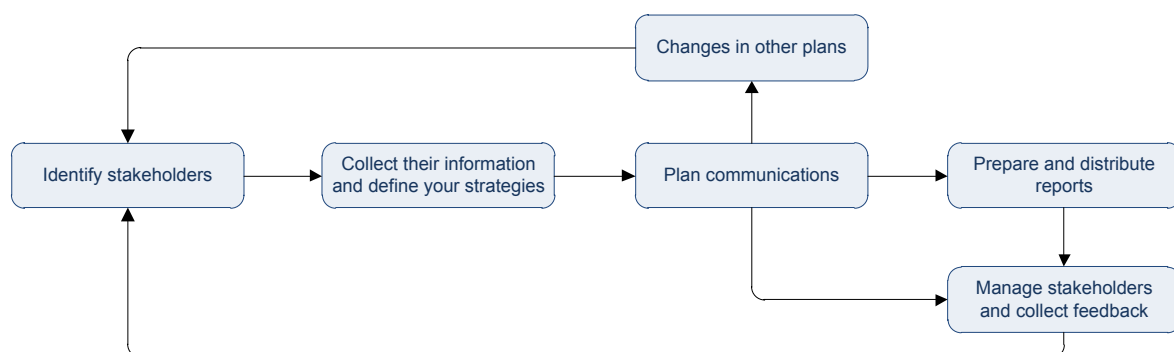Figure 4.14 shows is simplified communications management.

Figure 4.14 - a simplified communications management.

Draft of the fifth edition of the PMBOK Guide has a new knowledge area: Project Stakeholders Management Knowledge Area. Most processes and tasks of this knowledge area are organized in the current communication area, discussed previously.

This area is connected to all other areas (as usual). For example, you might decide to outsource a part of the project in the middle of it to decrease time. In this case, the seller would be your new stakeholder and you should manage it too.

Risk planning needs the involvement of external stakeholders and it is recommended to select the most knowledgeable external stakeholders for this. External stakeholders are stakeholders that are not members of the project team.

Executing and Controlling the Communications

You will act exactly as planned; meanwhile, you might realize that some of the planned solutions are not as effective as they should be. In these cases, you should issue a change request which will go to the *Integrated Change Control* process and implemented in plans after approval.

Report Performance process collects all periodic analysis information from knowledge areas and prepares reports. One size does not fit everyone, and you should prepare many types of reports for different stakeholders. This information will then be distributed to the receivers and feedback is collected.

4.10   The Risk Knowledge Area

Any uncertain event in the future that is capable of impacting the project is called risk. Risks either have a positive effect, which are called opportunities, or a negative effect, which are called threats.

Being uncertain does not mean that you can only wait to see if they happen. You should proactively manage them and make your own future; this is called risk management.

Planning the Risks

Risk planning starts with identifying risks. You should identify as many risks as possible and do not forget to always look for new risks or update the specifications of the previously found risks.

Risks are added to a document called the risk register. You should at least mention how probable it is and how it will influence the project. It is sometimes needed to define risk impact separately for each constraint; e.g. the impact on time, impact on cost, and impact on quality.

There are usually many risk items and it is not practical to plan responses for all of them. We will select the most important risks and only plan their responses. This process is called Qualitative Risk Analysis. You should define the probability and impact of each risk item and define their importance by multiplying these two parameters or using similar methods. Now you will have a ranked list of risks and will choose the top items (figure 4.15)
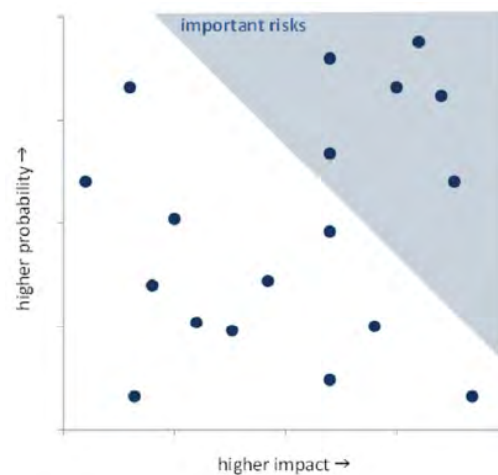
Figure 4.15 - a graphical representation of qualified risk analysis

Selected risks, which are the most important ones, will go to the Plan Risk Responses process. This process finds suitable responses for each of them. Installing temporary handrails in elevated locations is an example of a risk response. Responses will decrease the probability or impact of negative risks and increase the probability or impact of the positive risks.

Do not take it wrong: responses are not workarounds you might use after the risk happened; they are usually activities you do before its potential time to take control over it.

You should always monitor the risk items and change their probability or impact values if needed. This can change the importance of risks and make you plan new responses for other risks.

Figure 4.16 shows an overall review of the whole risk management knowledge area.
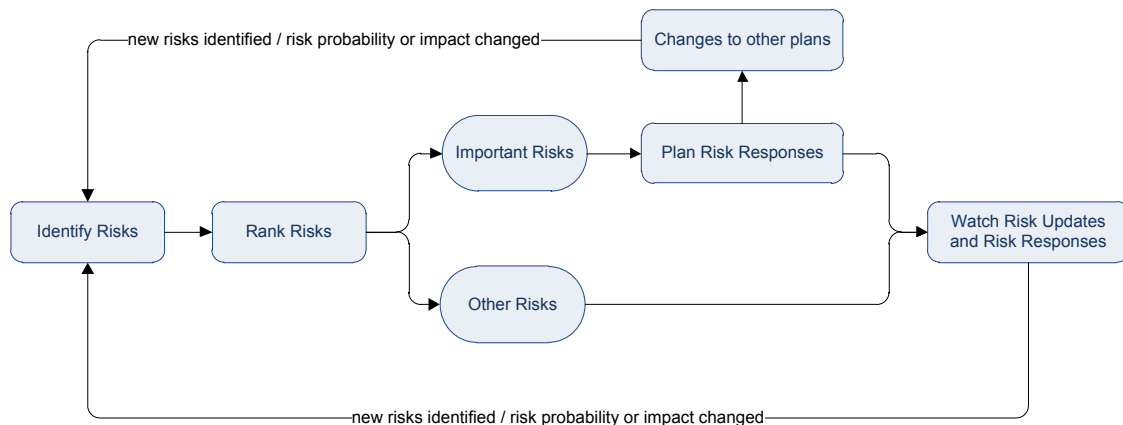

Figure 4.16 - simplified risk management knowledge area

Quantified Risk Analysis is an optional process which aggregates the probability and impact of the risk items and outputs the probability of the project factors like cost, time, criticality, etc. You can calculate parameters before and after applying the risk responses and evaluate their effectiveness.

Executing and Controlling Risks

Each risk response needs an owner. This owner is responsible to track response activities and risk status, and to report on them. Risk owners and other team members should always be involved in updating risk probabilities and impacts and identifying new risks.

4.11   The Procurement Knowledge Area

The project procurement management knowledge area deals with contracts. These contracts are used to order or buy products, equipment, services or expertise. If you are involved in EPC projects, you know that many contracts are used in all three parts of your project (Engineering, Procurement, and Construction) and so the PMBOK Guide's procurement management processes should be used for all of them.

Procurement is managed by the following processes:

- Plan Procurements   (Planning process group)
- Conduct Procurements   (Executing process group)
- Administer Procurements   (Monitoring and Controlling process group)
- Close Procurements   (Closing process group)

Remember that "contract" is not necessarily a long and difficult document. Contracts can be simple and short documents and they can even be verbal. For example, if you ask an old colleague to design a small engineering part of your project and receive one thousand dollars in return and he accepts that, you both come into a contract; a verbal contract. Now you should use some or all of the procurement knowledge area, to some extent, to manage his work.

Planning the Procurement

There are many parts of the project which you can either buy (or outsource) or build (accomplish in-house) and you should decide on them. Each decision has its own pros and cons and impacts time, cost, risks, quality, etc.

After selecting the procurement items, you should choose the potential sellers, define seller selection criteria, and prepare procurement documents.

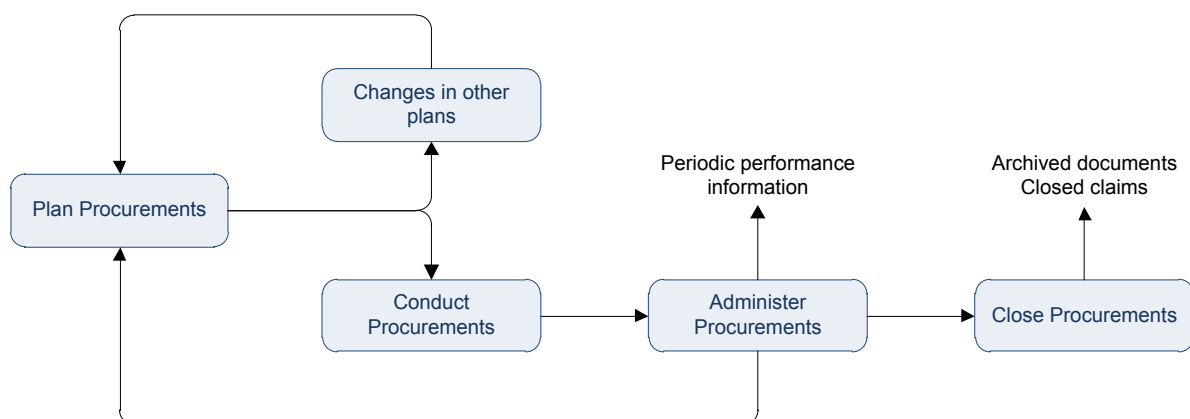The figure 4.17 shows a simplified procurement management.

Figure 4.17 - simplified procurement management

Procurement interacts with all other knowledge areas. When you decide on procuring an item instead of keeping it in-house, this changes everything. You might then need to spend a different amount of money, but you would not need as much human resource as you would have needed for doing it in-house; your risks might be lower depending on the type of contract, etc.

You might need to run procurement processes later. Suppose you are behind schedule; you realize that you can reduce time by outsourcing a critical activity to a qualified contractor. You evaluate every aspect of it in the integrated change control process and if accepted, you will run the procurement processes to plan it.

Executing and Controlling Procurement

You should start selecting buyers in proper time, based on the procurement plan and award the contract. These will be done through Conduct Procurement process.

You should start administering the contract as soon as it becomes effective. Administering is done by monitoring progress, managing relationships and protecting legal rights.

Each procurement item or each contract, in other words, needs a closing process. It involves formally accepting the output, finalizing claims, paying the remaining costs according to the contract, and archiving the documents.

5   Where to Go from Here

You probably belong to one of these two groups:

- Those who want to have a big picture of the standard in a fast and easy way - I hope this book has served you well and you are satisfied with the knowledge you gained. These are my recommendations for you:
  - Take a simulated PMP exam (full length or short) and evaluate your current knowledge. You might not consider yourself prepared, but you might still have a high score. I know people who had a training equal to what you had in this book and earned around 60% score, which is perfect. They are usually people with a very good understanding of the project management knowledge. If you are one of them, why not spend some more time preparing for the exam and earning your PMP certification?
  - You may find this level of knowledge enough for your needs, but I still recommend that you obtain a PMP exam preparation book and occasionally read small parts of it. You will slowly progress, without much effort.

- You consider this book your starting point and want to become an expert on the PMBOK Guide. I wish you luck and I hope that you have found this book beneficial. In my opinion, these would be your minimal needs for learning the standard:
  - The Standard itself! You should have the PMBOK Guide and read it carefully. You can become a PMI member and download the standard freely instead of buying it.
  - One PMP exam preparation book. There are currently many books on this subject and you can choose freely. You can even use more than one book, but it seems that you can succeed with one.
  - Simulated exams. You should have as many simulated exam packs as possible and use them to evaluate yourself and prepare for the long and heavy exam. Participating in a four-hour exam is not easy and you should practice. The more tired you become, the less your focus will be and the less success you will have. The knowledge itself is not enough; you should be prepared for the marathon! In addition, be careful about the simulated exams; you might not have many of them and you should spend them wisely. Once you pass one of them, you will probably remember the questions and answers and you will not be able to use it again for your honest evaluation.

6   References

- A Guide to the Project Management Body of Knowledge (PMBOK® Guide), Fourth Edition, PMI, 2008
- A Guide to the Project Management Body of Knowledge (PMBOK® Guide), Third Edition, PMI, 2004
- A Guide to the Project Management Body of Knowledge (PMBOK® Guide), 2000 Edition, PMI, 2000
- A Guide to the Project Management Body of Knowledge (PMBOK® Guide), PMI, 1996
- Draft of A Guide to the Project Management Body of Knowledge (PMBOK® Guide), fifth edition, PMI, 2012
- Practice Standard for Work Breakdown Structures, second edition, PMI, 2006
- Practice Standard for Scheduling, second edition, PMI, 2011
- Managing Successful Project with PRINCE2™, TSO, 2009