Tutorial letter 501/3/2014

Project Management

PRM3701

Semester 1 and Semester 2

Department of Business Management

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Project management in perspective

Be not afraid of growing slowly

Be afraid only of standing still

– *Chinese proverb*

Congratulations on your decision to study project management at third-year level. Perhaps you have done so because you need an elective subject, it sounded exciting or you have a strong desire to manage your own project one day. Some of you may already be involved in project management and have built up practical experience in the discipline.

Many students are overawed or greatly intimidated at this point. Relax; this is not rocket science or applied maths. If you study diligently and with an open mind, complete the assignments we have set in time, and work through the exercises in the textbook and on the textbook-related website, you will successfully complete this course. This course is an introductory course. When you have mastered the specific outcomes required, you will be adequately prepared to manage your first project and should not make a fool of yourself in doing so. Mix this with some hands-on working experience and perhaps some advanced education in project management, and you shall be able to really "shoot for the stars" in your career. Note that project managers are at the sharp end of the business – at least in projectised and matrix organisations – and often rise to the top of the organisational tree. A project is often regarded as a business within a bigger business and therefore provides excellent training ground for bigger, more complex responsibilities later in your career.

Hopefully you have a shiny new textbook in front of you (the 5th edition of *Project* Management: The Managerial P*rocess* by Larson and Gray) and are wondering what this subject is all about. The many textbooks on project management that are available follow a specific approach chosen by their author(s), although all cover the same subject matter in one way or another. Larson and Gray, the authors of the prescribed textbook for this course, have a more strategic leaning which has general appeal and is less focused on the technocrats among us (ie the engineers, scientists and IT practitioners).

A considerable body of project management knowledge has been built up over the past 50 years. This body of knowledge (BoK) derives from the collective knowledge and experience of thousands of project management academics, scholars and practitioners working in various industries throughout the world and comprises "best practice" in project management. This database of information has been taken up by a number of organisations worldwide, including:

- the Project Management Institute (PMI) – PMBOK® (USA)
- the Association for Project Managers (APM) – APM BoK (UK)
- the International Association of Project Managers – IPMA BOK
- the AIPM Competency Standards for Project Management (Australia)
- ISO 100006 – guidelines for quality in project management

Although there are many project management bodies of knowledge held by various custodian organisations, the PMBOK® of the PMI in the US is the most widely known. The content of the PMBOK® is what every project manager should know – and is what we teach in this course (PRM3701). Many individuals throughout the world who can prove that they have both academic qualifications and practical working experience choose to demonstrate their competence by certifying with the PMI or other professional bodies. Take a look at some of the job adverts for project managers on the internet and note how often the requirement for a PMP (the PMI's Professional Project Manager certification) appears. The trend towards professional certification is growing and may become an industry standard sometime in the future.

The project management methods and tools that you will study in this course do not have universal application in all projects and across all industries. They are not "plug and play" solutions. Instead, each industry and company adapts and uses what adds value while leaving out what does not. Construction and IT projects are not managed in exactly the same way. Some companies have very high-level, complex methods; others use more simple methods; but most can manage their projects very successfully. The implementation and application of high-level, professional project management can be very expensive and is just not justified in some cases. The level of application of project management tools and techniques is very much a case of "horses for courses". Contrast, for example, the needs of a local swimming pool builder (who executes small projects) with the construction of the Gautrain (a multi-million rand transport infrastructure project).

Project management is considered by many to be a subset of operations management and you shall notice during your studies some overlap with other management subjects that you have already completed, for example strategy, quality, operations, supply chain, procurement, human resources (HR), and even contract and labour law. Be careful: **project management is not general management.** Furthermore, project management is not an extension of operations management but rather has some tools, methods and techniques which are very unique. Throughout this course, we will refer to the project management philosophy – a way of viewing and acting on things which is very different from the other management disciplines mentioned above. Some students will have noticed from their own life experience that there is much loose talk about project management, that the popular "buzz words" are thrown around liberally in conversation and that there is little true understanding of what project management really is. A flashy sign on an office door, a job title or MS Project loaded onto your laptop do not make you a competent project manager. Only your actual performance measured against your project's time, cost and performance (TCP) requirements will determine that. The working life of a project manager is a bit like sitting on top of a pressure cooker – it is hot, it is uncomfortable, but you still have to keep things cooking and prevent the whole lot from boiling over. Project management is very good training for future CEOs. It is not an office job. To be effective, you will need to get out there, get your hands dirty, see what is going on, make some tough decisions, communicate,

negotiate, show your leadership and management skills, and … yes, even get some scars. Your intelligence quotient (IQ) and especially your emotional quotient (EQ) will be severely tested. The stress levels can be very high and you may discover that it may not be the ideal career for you. Project management is not for sissies.

There is no universal formula or talent recipe for project managers, although there are some basic trends and requirements which we will investigate in this course. You should recognise even at this early stage of your studies that a project manager is not a functional specialist, but rather a generalist and a businessman. All too often, very competent and successful functional specialists are rewarded for their good performance in their functional areas and promoted into project management positions. This is often a mistake since they do not have the training, the aptitude or the interest in pursuing a career in project management. We trust that this course will help you to decide if it is for you.

1. A PROJECT AND YOUR STUDY MATERIAL COMPARED

In this section you will follow the life of a typical, very simplified and hypothetical project and relate practical application to the project management theory as you are expected to study it. Do not worry if you do not understand fully after reading this section, or that some of the terms are unfamiliar to you. These will become more familiar as you work through the study material (topics 1 to 6) later on.

The short story which follows will demonstrate how all the loose bits come together. This section is the skeleton onto which we will hang the details later on.

You need to pay particular attention now, because you are the project manager in this story and we will tell you what to do and why you have to do it. But first …

2. SOME BASIC DEFINITIONS

Project	A temporary endeavour undertaken to create a unique product, service or result (taken directly from Larson and Gray, page 5). With the following characteristics: (1) an established objective (2) a defined life span from beginning to end (3) usually, the involvement of several departments and professionals (4) typically, doing something that has never been done before (5) specific TCP requirements
Project manager	The individual responsible for executing the project within the organisation, using the money, material and labour resources allocated to the project to bring it to a successful conclusion, all within the TCP requirements.

Internal project	A project conducted with the organisation's own funds for an internal client. This could be for the purposes of recapitalisation, infrastructure improvement, product or process improvement, or implementation of some other change. All costs incurred by the project are carried by the organisation itself. The purpose of internal projects is always to improve the competitive position (capability and competency) of the organisation itself.
External project	A project conducted by the organisation for an external client in a commercial relationship. The organisation invoices for the work performed and can make a profit (or a loss) from it.

3. THE PROJECT

3.1 The stakeholders of your project

(There are many more but only two are discussed here.)

3.1.1 Your company

You are employed as a project manager by AB Construction (AB), a medium-sized South Africa-based company which specialises in construction projects, especially bridge building. AB has a **portfolio of projects** (study Unit 3) in work throughout Africa but since two of these are very near completion, AB will soon have some excess capacity available. The executive management and the business development department are now actively seeking new projects.

AB understands construction projects and project management. This means that AB has

a project-based organisational culture and style (methodology)	commonly held knowledge on how to get the work done, what means are considered acceptable to get work done and who is influential in facilitating getting the work done (study units 4 and 14)
an organisational structure	best suited to implement and execute projects successfully in their chosen field or industry (study units 4, 13 and 14)
organisational process assets	(1) processes and procedures (study units 5–12 and 15) (2) a corporate knowledge base

3.1.2 Your client

The little village of Bops, situated on the Limpopo River, had grown into a large town and now spans both sides of the river. The townspeople cross the river by foot each day, but in summer the river swells and all travel over the river is cut

off for weeks at a time. The local council (the BLC) has identified the need for a bridge connecting both sides. The BLC went out on an open tender and issued a request for proposal (RFP – Larson and Gray, pages 60 to 62, and study Unit 15), inviting all interested construction companies to submit their proposals to build a bridge. The closing date for all interested parties is in 90 days' time (12h00 on 1 July 2013). All tenders submitted late will not be considered.

3.1.3 The background to your project

The construction industry is highly competitive and AB very quickly picked up that a RFP had been issued by the BLC. Your executive management team collected the RFP with all its supporting documentation (study units 3 and 15) and sat down to analyse it. A **strategic decision** needed to be made quickly. Should AB tender (ie submit a commercial offer) or not? Was this in line with their corporate vision and mission? Was there a strategic fit? Does AB have the necessary competencies and resources to do the work? Is this in line with AB's core business? Did it fit in with their existing portfolio of projects? Was the risk–reward trade-off acceptable?

The decision was made: Yes, go ahead. It was to be an **internal project** and the final output was a commercial offer to the BLC. A team of experts was quickly assembled from the many functional areas to assist, forming a project bid team. (Note how all the requirements for a project come together – study unit 1).

What did this team do? They

- defined the project (study unit 5)
- estimated times and costs (study unit 6)
- developed a project plan (study unit 7)
- assessed the risks (study unit 8)
- conducted a thorough financial analysis, considered all the commercial and legal implications and prepared the offer (this last point is not a direct project management responsibility)

Following on this, AB's offer was signed and submitted – before the due date.

Take note of the following crucial issues at this point:

- **What the bid team did here (the first four bullet points above) was done only at a very high, macro level due to the cost and time constraints. They did this all in 90 days, remember. After all, the bid team would not do "too much" work to secure a contract AB might never get.**
- **By making a formal bid, both the bid team and AB's executive management team have taken on both huge responsibility and risk. They made an offer and if it was accepted by BLC; AB is committed to completing the work and there is no turning back.**

After the tender submission, there was the usual waiting period while BLC evaluated all the tenders that were received. After AB was pre-selected among the final three preferred contractors, there followed the usual rounds of discussions and negotiations and renegotiations (study unit 15) to clarify misunderstandings, review the details and

perhaps resubmit amended tenders. Finally, the contract was awarded to AB (study unit 15).

Take note of the following crucial issues at this point:

- **This waiting period is very trying for all parties. The project manager for the project may already have been selected and, if so, will be drawn deeply into the negotiating process (study unit 15).**
- **Although it happens at any time during the project life cycle (study unit 1), this is the favourite time for certain undesirable "stakeholders" to creep out of their holes with hands stretched out seeking favours, backhands or facilitation fees, especially if the project is to be funded with public money. There is sometimes a strong incentive for a company to "buy the contract" by succumbing to these pressures. A professional project manager has an ethical responsibility towards all his project's stakeholders and we advise that if you fall to the will of the devil, he will soon control you. A professional and responsible project manager has enough problems to occupy his time without adding this one to his lot. Consider also that if you give in this temptation and are caught out (and sooner or later this will happen), your reputation will be ruined and you will be disgraced for the rest of your natural life. Read the daily papers; we have many practical examples of this around us, here in South Africa and in the rest of the world.**
- **There is no standard for this waiting time. In the case of very small projects, an order may be awarded within hours. In the case of the sale of the Hawk trainer aircraft to India, the time from making the first contract to order placement was a reputed 24 years. This implies that the seller, BAE Systems in this instance (a multi-national defence contractor located in the United Kingdom), invested its own money for 24 years. Unfortunately, this relationship was tainted with allegations of corruption and underhand dealings.**

That concludes the background to the AB bridge building project.

3.1.4 Your project (is to build the bridge!!!)

AB accepted the order from BLC and held a big party to celebrate receipt of the contract. The press was there, and now every general and specialist trade newspaper is full of pictures – your MD smiling and shaking the hand of every stakeholder in Limpopo, it would seem. The people of Bops are ecstatic, the BLC even more so because finally they can show some progress on their election promises. Stakeholder expectations are very high.

Your boss calls you in and tells you: "Congratulations, you are the new project manager". He hands you some papers. You go back to your office, look at your degree hanging proudly on the wall and think – What now?

Let us take stock and think about this.

You have before you a tattered copy of Larson and Gray (you passed the course with distinction, remember), a **project charter** (study unit 5) authorising you to lead the project, a copy of the signed contract, an official purchase order from BLC and a large

pile of paper which the bid team prepared all those months ago. You note that this is an **external project** because AB will invoice for their work and intends to make a profit. You open Larson and Gray on page 7, look at figure 1.1, and see that you are at the start and that the clock is running (ie the pressure is on). You are adamant that your project will not fail, so you take some time to review the conditions for project success. The PMBOK® (2008:9) states that a project's success is measured by product and project quality, timeliness, budget compliance and degree of customer satisfaction. Broken down further, we could gauge project success by measuring

- customer satisfaction
- compliance with the project's TCP criteria compliance with its quality and safety criteria
- the successful and controlled inclusion of scope changes (scope creep and baseline changes)

Making a decision as to whether or not a project has been successful is not as simple as it may seem from the above argument. Consider by way of an example some of the following:

- **A strong characteristic of project management is balancing the competing project constraints of scope, quality, schedule, budget, resources and risk. The relationship between these is such that a change in one will have an effect on at least one other constraint. For example, a reduction in the budget for a project will force a change in project scope or a reduction in quality (or even both). If these trade-offs have not been mutually agreed upon between the contractor and the client (and sometimes also other stakeholders), project success may be questionable.**
- **Project management demands that all project stakeholders be considered, not only the customer. The customer of the Gauteng toll road system may be well satisfied with the project but other stakeholders (motorists, commercial truckers and supply chain operators) presently have a very different view of the project's success.**
- **Perceptions strongly influence the success or failure of a decision. A software developer who develops a new system and meets all the requirements for project success may declare the project a success. However, if the system is not used by the user because it is overly complex, he may view it as a failure. Has any user ever been really satisfied with a new enterprise resource planning (ERP) installation?**
- **The project success criteria and their ranking are not equal across organisations or industries, neither are they always automatically a financial consideration. In aerospace the primary measure is engineering performance (eg fuel consumption per passenger seat mile) while in a Disney theme park it is visitor safety (eg incident-free visitor days).**
- **Finally, it is our assertion that any project which is not completed within the boundaries of ethical conduct is not a success. Any project, even if it does meet the success criteria stated above, cannot be declared truly successful if it is tainted with signs of ethical misconduct, corruption, nepotism and negative media exposure. We should also include the environmental considerations. Can a project which ended up destroying the environment be considered a success?**

Take a quick look at your wall, at all those golden rules for project managers that you dug up on the internet, and make a note to remember just five which your project management lecturers keep going on and on about:

(1) Do not surprise your boss or your client. Keep them well informed, often and always. Be truthful, even if it is bad news. They have much more power than you do and they can be useful allies if things go wrong – something always goes wrong.
(2) Communicate with all your stakeholders, often. Neglect to do this and somewhere, somehow, they will sink you. Build trust.
(3) Projects do not execute themselves, people do. Consider them – always.
(4) You are the project manager. This is your project. It is your responsibility. Do not shirk it – you are not a politician.
(5) You cannot manage a project from the comfort of your office. Get out there … Accept management by walking around (MBWA).

Now take a quick look at that old textbook and have an "aha" moment. It should all start to come together now.

- Why is this a project? Why do we do it this way? (study unit 1) Recall that project management is very different to other forms of management. The project management people see things differently, they act differently, and they use some really funny terms and acronyms (study unit 2).
- You might wonder how and why AB ever took on this project. We must all be crazy, you think. Which strategic considerations led us here? (study unit 3) You begin to understand how the executive management team of AB thinks. It is all starting to come back now.
- Your mind is still on AB, on its structure and culture (study unit 4). AB has a matrix structure, and you begin to realise that both the structure and the culture have a strong influence on how you will work with others and especially with your co-workers. New and inexperienced project managers like yourself will make mistakes and you are relieved to see that AB's culture is tolerant of this.

Finally, you take some quiet time to review the pile of papers on your desk. You note:

- The bridge must be finished on a certain date – your project has a **time constraint**.
- You need some civil engineers to design the bridge and those whom AB have available are largely committed to a project in Cape Town – your project has a **resource constraint**.
- The discipline of project management requires the preparation of certain documentation throughout the lifetime of the project and not all are prepared by the project manager. These include a user requirement, statement of work (SOW), work breakdown structure (WBS) and organisational breakdown structure (OBS).
  Take note of the following: Documents like a SOW and WBS are to the project manager as a balance sheet and income statement are to the accountant. Any project manager throughout the world will know – irrespective of the industry he or she works in – what to find in a SOW, a WBS and all the other typical documents generated by project management.

There is one major difference between project management documentation and accounting documentation. The content of financial reporting documentation is largely prescribed by the national accounting standards. This is not true of project management documentation where the nature of each project determines the type and format of the documents used. For example, a WBS document for a small pool building project could fill one A4-sized sheet and on a complex project like the Gautrain it could fill hundreds of A4-sized sheets.

A project manager has a lot on his mind, foremost of which is the TCP concern. Our time is running out and we need to get started. Where do we start?

A project manager has to lead and to manage throughout the project's lifetime. You will never do so in equal measure because there are times and situations when the need for one or the other will prevail. You are now at the start of a new project. You must demonstrate leadership and start immediately to put your mark on this project. Your stakeholders must recognise this from the start. This is not a "human ego" or "office politics" exercise, but a subtle declaration that you will take responsibility and are responsible for the success of "your" project. The stakeholders – especially AB and BLC – are looking to you for direction, for action and for instructions. Nothing will start on this project by itself. You need to get the momentum going, and to keep it going, from now until the end of the project.

From this point on, you will conduct two series of actions in parallel (ie concurrently or at the same time).

Project Tools & Techniques

- Defining the project: study unit 5
- Estimating: study unit 6
- Project networks: study unit 7
- Managing risk: study unit 8
- Schedule resources & costs: study unit 9
- Reducing project duration: study unit 10
- Monitoring progress: study unit 11
- Project closure: study unit 12

(the hard issues)

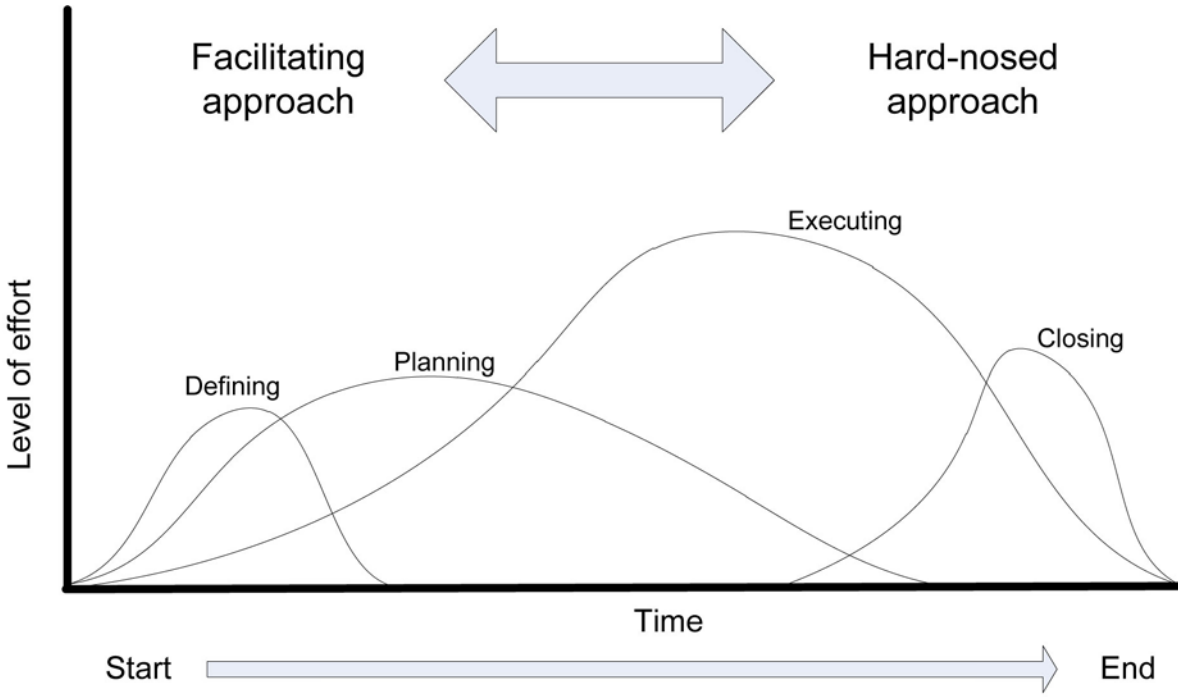
Managing People

- Leadership : study unit 13
- Teams : study unit 14

(the soft issues)

Let us start with managing people, the right-hand side of the figure above). From the start to the end of your project, you will need to lead and manage people (ie all your project's stakeholders, but especially your project team and yourself). Managing people is like herding cats; it is hard work and can be very, very difficult. It is important that you do this successfully; your project depends on it. You shall be called upon to do everything that you have ever learnt before and more about managing people – educating, motivating, leading, managing, negotiating, resolving conflict, managing change and more. A key element in all of this is **communication**. Most of this will be

with your project team, a diverse group of people with a variety of specialist skills who will help you to get the job done. Your team will not be static in number or skills set. They may not even sit together, although this is often preferable. You will find that your leadership and management approach to your team and your project will change as the project progresses through the project life cycle. Although this is not a hard and fast rule, the general trend will be as shown in the diagram below:



For your project, we expect to have a lot of design engineers at the beginning or early stages; later on we will have less of them and far more “hands-on” construction workers. Note that the people in your team are only allocated to you to work on the project and that you are not their direct “boss”. You have no direct line authority over them. This means that the functional manager of engineering (the engineering manager) will allocate engineers to your project as and when they are required. Take note that the engineering manager has his or her own priorities (which will almost certainly not be 100% aligned with yours) and he or she will need to allocate scarce resources to various competing projects within AB. In practice, this means that you will often negotiate with him or her to “give” you more or less engineering support. Remember the resource constraint we spoke of earlier. This is it. Be aware though that there are many resource constraints on a project; more will appear as you progress through the life cycle of your project. Not all resource constraints are related to labour, but also involves material, money, equipment and legal issues – and maybe even geographical in this case (ie bad weather, storms and floods).

For the purposes of the bridge building project, you will now have to go and see all the functional managers and negotiate with them to allocate their personnel to your project. Once you have them, start immediately to “weld” this diverse group into a team.

A popular joke that is often made about active project managers is that they are easily recognised by the large holes they have in the legs of their pants. This is because they spend so much time on their knees begging the functional managers for additional resources. Many experienced project managers will agree that there is a lot of truth in this statement.

Parallel with managing people, you will need to go through a series of project-related steps (the project tools and techniques referred to in the diagram above – the left-hand side). The first time, you will go through them sequentially but because projects are dynamic and things change, during the rest of the project lifecycle (the time from project start to finish) you will revisit and amend them as required.

Before we go further, take a look at figure 1.1 on page 7 of Larson and Gray. What you will have to do now is (1) define and (2) plan your project. Note that the stages (sometimes also called project phases) overlap and that we can have up to three stages in work at any one time.

Before we start, there is one point to keep in mind. Defining and planning your project can be a lot of work. You will not do this alone although, as project manager, you must ensure that it is done. We said earlier that the project manager is a generalist and the members of his or her team are functional specialists. It is obvious then that your project team will apply their specialist knowledge and help you to define and plan your project.

(1) Defining the project (topic 3, study unit 5)

Although this is not obvious from the heading, what you have to do here is to make a long series of project-related decisions and to document (define) these in a way that is clearly understood by the project management team and the project stakeholders. These “what”, “how”, “when” and “by whom” project decisions are reflected in a series of formal documents that includes a SOW, a WBS and an OBS. Much of the information that you will require to do this will already be available to you at a high level from the documentation prepared by the bid team when AB was competing for the contract from the BLC. (You should recall that this information forms part of the pile of papers your boss gave you when he made you the project manager.)

The issue of “what” to build merits further discussion. It is meaningless to tell your team to “go and build me a bridge” in Limpopo. Must it be of concrete, structural steel or wood? Where exactly do you want it? What kind of traffic must it carry? What kind of environmental conditions must it withstand? Is it a road or a rail bridge? The list goes on and on. Quite obviously, some very detailed specifications are required. Generating these specifications can be an enormous task and is generally left to a specialist function referred to as systems engineering. The entire process, from both an engineering perspective and a project management perspective, can be complicated. (Systems engineering will be discussed in the honours-level course.)

It is a generally held view that the most complex of all possible build projects to manage are space vehicles and nuclear submarines. Can you imagine the level of effort that goes into the preparation of specifications for these?

(2) Planning the project (topic 3, study units 6, 7, 8 and 9)

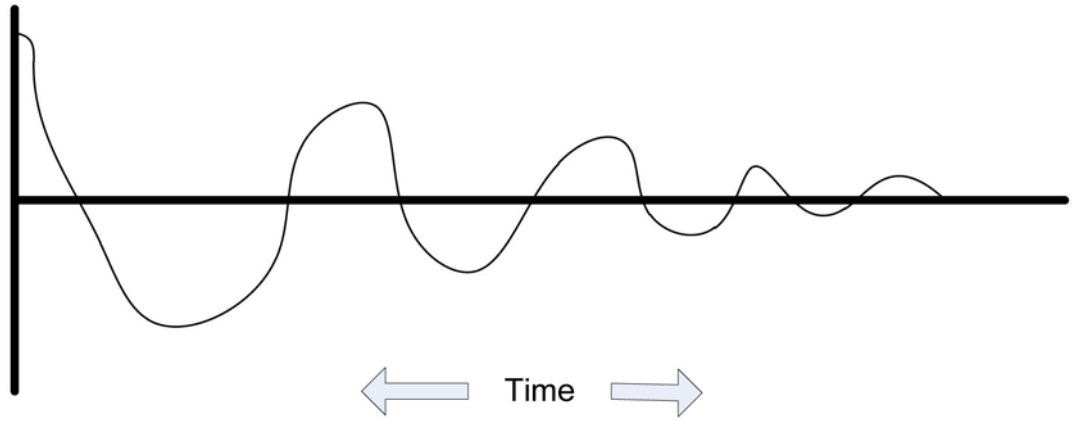
Planning the project entails taking what you have previously defined and breaking this down further into much smaller, more detailed, easily understood and executable chunks. In other words, the "what", "how" and "by whom" is broken down further. The "by when" aspect becomes much more significant and detailed. As in the definition phase, all of this work is documented in the project schedules and in a series of internal documents defined by the project organisation itself. The basic information from which to do this should again be available to you at a very high level from the previous efforts of the bid team.

Remember that defining and planning is an ongoing activity. Things on a project change constantly and you, in your role of project manager, will be required to accommodate them if the project is to be executed successfully.

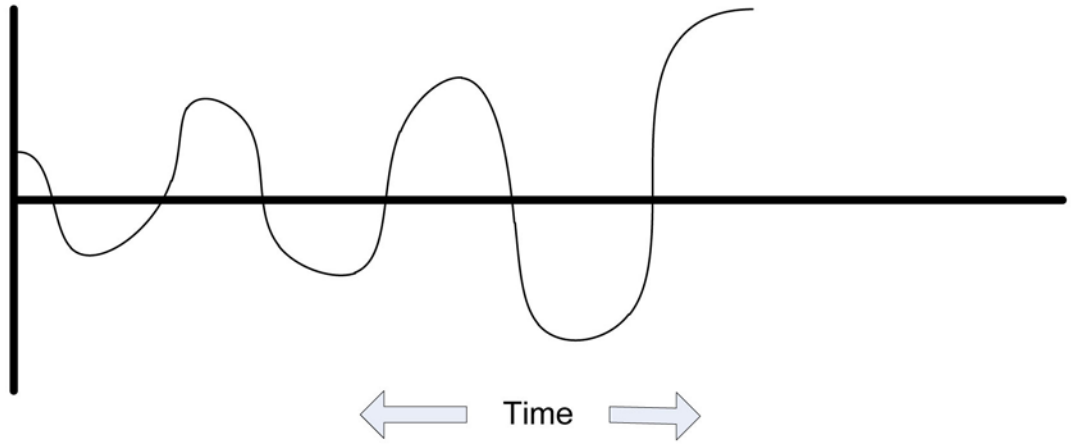
Before we move on to the next phase, let us review what you have achieved in the definition and planning phases of your project. Consider the following:

(1) It has prompted you (and your team) to **think things through** on the project: what you must do, how you will execute it, what resources you need and when, what you are expected to finish and by when, where potential problems lie, how you could overcome them, etc. The list goes on and on.
(2) You needed to make some fundamental project decisions and this was the way to do it: By writing them down in a series of project management documents, you formalised and institutionalised them. The project management documents that you have generated up to this point are known collectively as the "project plan". The project plan is never static and will be constantly updated as your project develops.
(3) You needed to communicate formally with all your stakeholders, but especially your project team, what needs to be done on the project (in substantial detail) and who will do it. Defining and planning your project created the direction (and some of the documents) that your project team needs.
(4) Many companies today run the entire business through their ERP system and project management information system (PMIS). No formal project management textbook will tell you this, but part of the planning process is to load your project onto the company's ERP/PMIS system. You cannot run your project in isolation of AB and its internal management systems.

To conclude this point, presented below is a humorous but largely accurate depiction of what happens on projects that fail to plan. Trust us on this: we have worked on projects like these ourselves.



A) The level of confusion and uncertainty on a project with good planning (i.e. becomes more stable with time)



B) The level of confusion and uncertainty on a project with no or inadequate planning (i.e. becomes more unstable with time)

It is unfortunately a weakness of project managers in South Africa to jump into the execution phase too quickly and to try and plan as we go along. This "*'n boer maak 'n plan*" (an Afrikaner makes a plan) approach should be resisted. Always plan properly, from the beginning. How often in South Africa have we seen a newly smoothed and tarred road being torn up, sometimes within only a few days of being laid, because someone forgot to define the requirements and to plan for the drain pipes or electricity cables which need to cross under it? This is very stupid if you think of the TCP implications. Good project managers are always thinking of the TCP implications.

(3) Executing the project (topic 4, study units 10 & 11)

Figure 1.1 on page 7 of Larson and Gray shows clearly that your project shall be in an execution phase from start to finish and that this phase consumes the greatest portion of the project's resources (ie material and labour), judging by the level of effort expended. Although you (as the project manager) will have a lot to do during this phase, you will have to keep the momentum going, be flexible, and adapt constantly to changes and new developments as they occur. Your abilities in both leadership and management will be tested on a daily basis. If you have failed to define and plan your

project properly, or have taken some short cuts, the effects of not doing it properly will show up here.

For many project managers and their project teams, this is the most exciting and invigorating phase of the project because you are able to see some tangible output flowing from all your efforts. This sense of creation is what keeps many experienced projects managers coming back for more despite the hardships which taking on a project management position usually entail. Can you imagine how proud you will feel when you are able to tell your husband, father or sister “I built that bridge”? Wow!!!!!

(4) Closing the project (topic 4, study unit 13)

Once the bridge is built and completed, you will have to take some very specific actions to close the project from a project management point of view (eg wrapping up, self-evaluation of management and performance, and retrospectives). Cutting the ribbon, taking a glass of champagne to celebrate and having some press photographs taken do not automatically close the project. On large projects, the closing phase can be of significant magnitude and can be considered a mini project of its own. What makes this phase difficult is that the gloss of the execution phase is gone; your project team have dispersed to work on new projects and those who remain have largely lost interest. The energy has gone out of the project but suppliers still need to be paid, customer sign-off obtained, accounts closed, financial accounts reconciled, reports written, etc. Consider also that you will have to clean up the site, remove the rubble, return machinery, etc.

As an example of the mood, consider a party that you hosted in your own home. Only now the last of your guests have gone home; the music has been turned off; you are tired and you still have to sweep up the mess, rearrange the furniture, carry out all the empty bottles and wash the glasses.

During this phase you will need to dig deep within yourself because you still have many things to do, much of which is administration. Do not allow yourself to become dejected; you still have to exercise leadership and management to get this phase completed. The closing phase cannot be neglected; it is just too important.

(5) Project management activities across all four phases

Since we have already discussed the need for leadership and teamwork from the very beginning of the project, we will limit this discussion to managing risk (study unit 8) and monitoring progress (study unit 11). Whether we like it or not, the very act of taking on a project implies taking on risk. Taking on a project means being committed to getting it finished successfully despite a host of factors (risks) – known and unknown – conspiring against you. Some risks you can do something about, others you cannot. The risk management process in project management prompts you to think about these risks, define and plan for them, make decisions on your response, document them and review them regularly – taking the actions you planned earlier. Stop at this point and review figure 7.1 on page 212 of Larson and Gray. The important thing to note is the relationship between the chances of risks occurring and the cost incurred to fix the risk event over the project life cycle. In the case of our bridge in Bops, consider as an example a labour strike (a situation not uncommon in modern South

Africa). What will happen to the project if or when this happens? What plans or action do you have in place to reduce the severity (the effect) of such a strike? You cannot stick your head in the sand like an ostrich and hope it will never happen. You have to prepare in case it does.

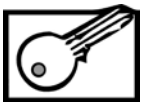
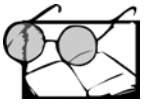
One function that is common to all project managers is the need to report (progress and performance measurement and evaluation). Almost from the very first day, and surely to the last, you shall be required to submit regular status reports to BLC (your client), to AB's own management (your bosses) and sometimes even to other stakeholders. The format that you will use is determined by the internal procedures of AB, perhaps also by BLC and by the complexity of the project you are managing. If more sophisticated reporting methods are used, you will report on many facets of the project (eg schedule progress, budgets, cash flows, risks, deliveries, contractual compliance and earned value).

Reporting entails accurately reflecting not only what happened in the past, but also forecasting what is going to happen in the future. The reporting process will put you in the limelight with your stakeholders and they will ask you some very difficult and probing questions. Your own bosses will know their business intimately and they know exactly where to look for potential problems. Be prepared to defend all the assertions and decisions you have made in your report. Above all, be truthful – even with the bad news. Management hates "surprises" which may come out later. Bad news does not get better with time. However, bad news that is known at the 20% point of the project life cycle gives management and others an opportunity to help you take corrective action and perhaps alter the project's final result. Bad news at 80% completion severely limits these opportunities. Accurate and truthful reporting provides those important early warning signals. If you come out of the reporting process sweaty and flustered, you are in very good company. Thousands of project managers around the world who are working on other projects feel just like you do. Surprisingly, the better the overall quality of your reporting, the less likely you are to have any of your stakeholders meddling in your project. Spare a thought for your executive management (who may be particularly hard on you); they carry the ultimate responsibility for the success of your project and are not out to get you while you are reporting. Your success is their success.

Many of the facts and figures you will require for your reports will be drawn from AB's ERP system. If you have not defined, planned and loaded your project on the ERP system properly, the facts and figures you will get for your reports will be nonsense. In the modern world, management (especially the accountants) get their "numbers" from the in-house ERP system and if these do not tally with your project numbers drawn from other sources, you will have a lot of unnecessary explaining to do with your next project report. This again emphasises the need for good project planning.

4. USE OF ICONS

To guide you effectively through this learning guide, we use specific icons. These icons serve as a guideline of what you have to do in each study unit. The icons that will be used in this learning guide are listed below, together with an explanation of what each means:

Icon	Description of icons
	**Key concepts.** The key concepts icon draws your **attention** to certain keywords or concepts in the topic or study unit.
	**Learning outcomes.** The learning outcomes icon indicates which aspects of the particular topic or study units you have to master. You will need to demonstrate that you have mastered these aspects.
	**Study.** The study icon indicates which sections of the prescribed book or the learning guide you need to study and internalise.
	**Read**. The read icon will direct you to read certain sections of the prescribed book or other sources for background information.
	**Reflection.** The reflection icon requires you to reflect on the important issues or problems dealt with in the study unit.
	**Checklist.** After completion of a particular study unit, you should confirm that all learning outcomes were in fact achieved.
	**Exercise.** The exercise icon refers to exercises that you must complete in order to develop a deeper understanding of the learning material.
	**Summary.** This section provides a brief summary of what was covered in a particular study unit and what can be expected in the following study unit(s).
	**Time-out.** The time-out icon indicates that you should take a rest because you have reached the end of a study unit or topic.

5. CONCLUSION

We trust that this discussion has given you a good overview of what project management is all about and what will be expected of you as a working project manager. What we have offered here has been simplified (even oversimplified) since our intention was to give you a basic framework or understanding of the subject. Now work to understand the details by following the various sections of this study guide (topics 1 to 6).

What we present in this introductory course is not the final word on the subject. Unisa offers an honours degree level course in project management in which we address all that is offered here at a much deeper level and some additional material, including international project management, project quality, project communication and the management of project management. There is still much to learn after you have completed this introductory course.

SUCCESS is not final,
failure is not fatal:
it is the COURAGE
to continue that counts.
– *Winston Churchill*

TOPIC 1

An introduction to project management

Aim

This topic is aimed at giving you an understanding of the unique nature of project management, how project management differs from other disciplines of management and in which situations project management is best used.

LEARNING OUTCOMES

When you have worked through this topic, you should be able to

- describe the attributes of a project and identify various practical examples
- explain and illustrate the various phases of the project life cycle
- explain what the project management process entails
- justify the use of project management based on the potential benefits
- explain what defining, planning, executing and closing the project entail

Topic study units

Study unit 1: Introduction to project management

Study unit 2: Project management philosophy and dynamics

Study unit 1

Introduction to project management

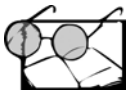
KEY CONCEPTS

- integrative approach
- program
- project
- project life cycle
- Project Management Professional (PMP)
- time, cost and performance (TCP)
- operations management and project management compared

OVERVIEW

This study unit contains a basic discussion of the concept of project management as a management discipline. To achieve the learning outcomes of this study unit, you must understand the need for project management and be able to define projects by means of their characteristics. In this study unit we contrast non-project management with project management as a special form, or discipline, of management.

1.1 THE UNIQUE ART AND NEED FOR MODERN PROJECT MANAGEMENT



Study pages 3 to 19 of Larson and Gray and the material that follows.

1.1.1 Projects demand a special kind of management

An important aspect to note is that project management is very different from general management and is, in fact, a very special kind of management. A project is defined as being one of a kind (see Larson and Gray, page 5), which explains the requirement for a different management approach.

The great need for project management can be seen in the world-wide interest and growth in project management as a management discipline (eg the membership statistics of the Project Management Institute or PMI). More and more business leaders proclaim project management as the wave of the future, since it provides managers with a powerful set of management tools and techniques with which to improve project outcomes (ie success). In many industries, for example in civil construction and arms manufacture, project management has become the accepted way of doing business. Author and management consultant Tom Peters has stated

that project management will be the essence of modern management training in the future, based on the management excellence and value added elements which the management discipline provides.

> Too many projects fail and too many brilliant ideas do not become innovations. Good project management is needed to increase overall project success rates and the rate of innovation (inventions accepted as technology). Technology in this case may be defined as the application of methods with the explicit intention of making money. The available statistical data on failed projects is alarming. Although the trend for project failure is declining, the requirement for improved project performance continues to challenge the project management profession. The PMI, one of the most prominent among the project management associations (see Larson and Gray, page 4), has recently added the CAPM (Certified Associate in Project Management) certification to its other offerings for aspirant project managers and project team members.

1.1.2 The increasing need for project management

Good project managers are always in demand as industry and business alike continue to implement project management principles. You must understand and be able to explain the importance of project management as highlighted on pages 10 to 13 of Larson and Gray. Note that the processes of project selection and determining corporate strategic direction are interlinked, and that a management decision to implement a chosen project signals a priority that will require the commitment of resources, expertise and management attention. Study this section (1.1.2) carefully and make sure that you are able to explain the six reasons why project management is important.

The need for innovation has been described as a cornerstone of market competitiveness and, at a more basic level, of economic survival. Such innovation demands project management. Around the world, wide-ranging incubator programmes are underway to create “idea factories”, to breed creativity and to incubate new technologies. In South Africa the Innovation Hub (in Pretoria) was established to enable partner institutions and businesses to collectively leverage their skills with the combined aim of improving their competitive market position. This and many other initiatives (eg the annual Technology Top 100 awards) form part of the Department of Science and Technology’s (DST) vision to bring into being a National System of Innovation (NSI). Silicon Valley in California, USA, is synonymous with innovation projects in the fields of electronics and information technology. Similar centres of innovative excellence are also found elsewhere in the world (eg in Germany for machine tools and in the UK for aerospace engineering and manufacture).

South Africa has produced several innovations linked both directly and indirectly to market needs. Many of these inventions or re-inventions are linked not only to tangible products but also to new methods or processes (eg deep level mining and mineral beneficiation). Many investors view Africa as the only emerging, real growth economy, offering both unique and multiple innovation opportunities. Innovation is hard, disciplined and focused work which must be coupled with diligence, perseverance and dedication. It takes talent, ability, knowledge and resourcefulness. Innovation is a unique characteristic and the most successful innovators usually work in one specific

field only. Innovation can take place anywhere and is not limited to any specific industry or organisational type (eg research and development [R&D] departments or research laboratories). The use of cross-functional teams (addressed later in study unit 14) is recommended as these are generally more diverse and creative in approach. Irrespective of the organisational form used (ie cluster, cross-functional or innovation hub), some form of project management will always be required.

1.1.3 Characteristics of project management

The scholarly definition of a project (the five points listed on page 5 of Larson and Gray) will make it easy for you to understand the major thrust of project management. This definition clearly indicates the triple constraints of time, cost and performance (TCP) and some project-specific terminology (complexity, unique event, one time effort, etc.). Projects therefore do not comprise routine or repetitive work (see table 1.1 of Larson and Gray, page 6). Projects require the combined effort of a team of specialists (each with his or her own unique skill set and core competency) working together under the guidance of a project manager. Accept (for now) that the project manager may or may not be "the boss" in the generally accepted sense but could also be a working member of the team with additional project management responsibilities (we discuss this point further in study unit 4). Therefore, anyone at any level or from any function could perform the role of project manager. In making this statement we assume that such an individual has some natural aptitude and will have had some formal training in project management, although the latter is not an absolute prerequisite.

Project management may be defined as the art of directing, co-ordinating and integrating human and other resources throughout the project life cycle (see figure 1.1 on page 7 of Larson and Gray) by using modern management techniques to achieve predetermined TCP objectives. Project management is a distinctive mindset and a unique management approach.

Another way to explain project management and its characteristics is to consider the nature of project work in terms of the project life cycle. In essence, this approach subdivides the full project lifespan into distinct phases, where certain project management activities are predominant in each phase. The USA National Competence Baseline version 2 (USA NCB v2) defines a project phase as "discrete time periods used as control mechanisms to ensure that the project is making satisfactory progress towards its objectives". Phases are sequential and time-constricted, and include groups of activities that produce specified results. Using this thinking, each individual phase of the project is considered a separate subsystem in the transformation process from project start to project end. Note that the terms "life cycle stages" and "life cycle phases" are used interchangeably, depending on which resource or text is being consulted.

The Project Management Body of Knowledge (PMBOK®) contends that the name and number of project phases are determined by the management and control needs of the organisation or organisations involved in the project, the nature of the project itself and its area of application. As a result, we find construction project life cycles, R&D project life cycles, defence acquisition life cycles and software development life cycle models, amongst others. Consider as an example the following life cycle phases by Steyn, H., Carruthers, M., du Plessis, Y., Kruger, D., Kusche, B., Sparrius, A., van Eck, S. & Visser, K. (2008:29).

Project phases at Sasol Technology

- Idea generation
- Pre-feasibility
- Feasibility
- Basic development

} Front-end planning

- Detail engineering
- Construction

} Execution

- Start-up and handover
- Evaluation and operation

Project phases at Eskom Generation

- Concept
- Development
- Execution
- Finalisation

Project phases at cement and concrete producer Lafarge

- Opportunity
- Feasibility
- Design
- Implementation

The time duration of each cycle is very important and may be regarded as critical in some cases. We discuss this problem under project duration and critical path in study unit 10.

1.1.4 Project management performance objectives

Project managers must have vision and visionary leadership. They need to see and to visualise the entire project life cycle as a value adding process. A transformation system (with subsystems or subcontractors) is needed to deliver the project outcome. All subsystems and their interactions must be managed with the project outcome (project success) in mind.

The project manager is ultimately responsible for project performance. Projects have special needs and demands in terms of TCP requirements. The project manager must understand the project's TCP constraints and ensure that the appropriate trade-offs are made. Consider the TCP constraints of a project in the light of the following general operational performance objectives of any business:

(1) **Quality.** Fit for purpose, do things right, eliminate defects, prevent injuries and lower the cost of quality. Less time and resources are needed to correct mistakes.

Consider the implications of internal quality (ie the next internal process) as your customer. Performance should not automatically be compromised for time and cost benefits (jump ahead and see figure 4.1 on page 106 of Larson and Gray).

(2) **Speediness.** Do things quickly and just-in-time. Speed enhances an organisation's market offering. The faster a customer can have a product or service, the more likely he or she is to support the business. This performance objective relates to the principle of streamlining, speedy decision making, and the rapid flow of information and materials (inventory) throughout the supply chain.

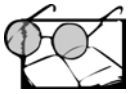
(3) **Dependability and reliability.** The markets need responsive suppliers. This means delivering according to promise to both internal and external customers. Stability in timetables and schedules reflects this dependability.

(4) **Flexibility.** Irrespective of the type of operations being followed, an organisation must be flexible to changes and be able to adapt. Typical examples of such changes include changes to delivery dates, lot sizes, product specifications and product range.

(5) **Cost.** Cost is directly affected by all four of the performance objectives, beginning with quality (since quality is free). Quality is the foundation for productivity in terms of doing the right things right the first time. The more an organisation's efficiency, utilisation and effectiveness are improved, the more value is added and defects, injuries and wastage eliminated.

The project management philosophy, discussed in more detail in study unit 2, argues for a very special place for the project manager as a change agent. The project manager is the general manager of a project and is expected to drive the integration process, overcome the difficulties, resolve conflicts and ensure that the project succeeds. This includes managing the information system and providing leadership to the project team. He or she conducts periodic evaluations and redirects resources to ensure the project stays on schedule. Throughout all of this, he or she must manage the risks facing the project and keep the client informed of developments. Taking the viewpoint that the customer is king, managing and fulfilling customer expectations is his or her most important task. All projects have internal customers (the senior/executive management, the project sponsor and perhaps even a project office) and the project manager has an obligation to keep them informed of the project's progress on a regular basis, usually following a format and frequency as defined by an organisation's internal project management methodology or policy.

1.2 PROJECT MANAGEMENT AND OPERATIONS MANAGEMENT COMPARED



Study the material that follows.

There is a view, held by many, that project management is purely a subset of operations management and that an individual who is skilled in operations management can easily fill a project management role. At best, this is only partly true since each management discipline has specific (and unique) management requirements that are largely prescribed by the characteristics of each.

The PMBOK® (2008:22) maintains that in many organisations the work performed can be considered as either project or operations work since they share a number of common characteristics. They are

- performed by individuals
- limited by constraints, including resource constraints
- planned, executed, monitored and controlled
- performed to achieve organisational objectives or strategic plans

The major differences between the disciplines of project management and operations management are shown in table 1.1 below.

Table 1.1

Projects and operations compared

PROJECTS	OPERATIONS
Require project management skills and techniques	Require business process management/ operations management techniques
Are temporary endeavours in terms of time required to complete the project (ie have well-defined start and finish dates) **Note: The output of a project is not necessarily temporary in nature. It can be either temporary (eg conducting a rock concert) or permanent (eg building a new bridge).**	Perform an on-going set of activities that produces the same product or provides a repetitive service
Develop tasks and standards as determined by the needs of each individual project	Conduct a well-developed set of tasks according to the standards institutionalised in a product life cycle
Low volume, high variety output; unique	Higher volume; repetitive work
High levels of uncertainty	Stable
Variable demand for resources	Stable, balanced use of resources
Vertical and horizontal communication across functional boundaries	Vertical communication within functional boundaries
High variety of skills sets	Limited, specialised skills sets
Often used as a tool to implement new corporate strategies	Exist as a result of the successful execution of earlier corporate strategies
Seek to stay within the allotted budget	Seek to maintain or exceed a prescribed profit margin
Multiple stakeholders	Fewer stakeholders

The contents of the table above should not be understood to mean that the projects and operations functions exist in isolation of one another in an “us versus them” scenario. Since project management is founded on the principle of successfully integrating many diverse resources and functions, the project and operations functions are mutually supportive and not adversarial. The operations function will often transfer its resources temporarily to assist in project execution. Similarly, projects (the project management methods and techniques) are often applied in the operations ambit. The PMBOK® (2008:12) indicates that projects and operations can intersect at various points in the product life cycle, such as:

- at each close-out phase
- when developing a new product, upgrading a product or expanding outputs
- improvement of operations or the product development process, or
- until the divestment of the operations at the end of the product life cycle

Note that the differences between projects and operations are often only one of perspective. Consider for example a store owner who decides to renovate her shop and contracts with a shop fitting concern to do this. From the perspective of the shop owner, the renovation is a project (a once-off endeavour she is unlikely to repeat for many years). For the shop fitter, the renovation may be the tenth one he undertakes in that particular year and, from his perspective, it is just another part of operations.

Our discussion up to this point indicates that projects vary in scope, size and complexity, and may therefore be plotted on a “typology of projects” as shown in figure 1.1 below:

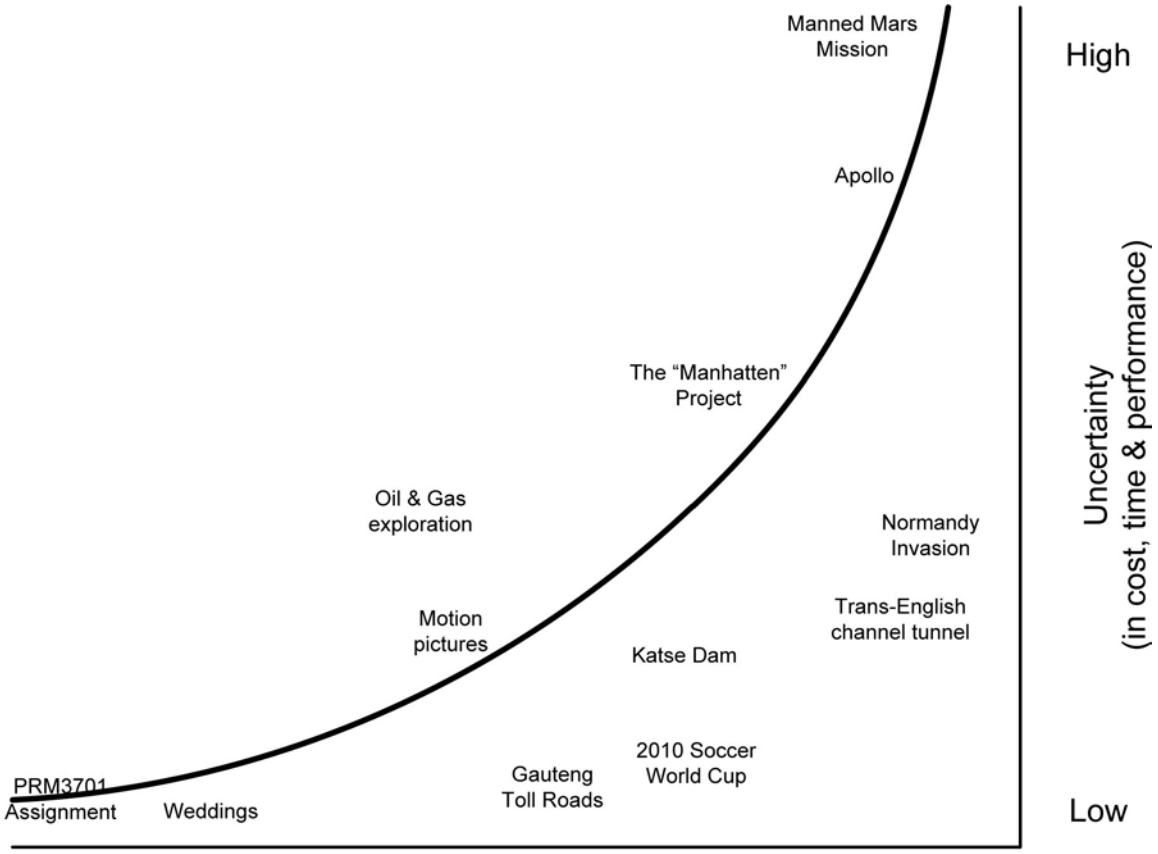


Figure 1.1

The typology of projects

Checklist

After completing this study unit, you should be able to

- explain the need for project management and the reasons why it is regarded as the management discipline of the future
- motivate why the management of innovation will rely on project management
- discuss the project life cycle and which activities are typical of each phase
- argue why project management is important
- explain why project management must be integrated into the parent organisation
- discuss the differences between project and operations management

EXERCISE

Complete the following exercise to verify your understanding of the subject matter.

This exercise is suggested for your own study purposes only and is NOT REQUIRED for submission to Unisa.

Load the student resource CD-ROM for the fifth edition of *Project management: The managerial process* by Larson and Gray. Select "Online Learning Centre" and then "5e. Online Learning Centre website". Select "Student Edition" and then "Chapter 1" from the dropdown menu. Choose "Multiple Choice Quiz" and complete all 15 questions.

E-mail the results (answers) to yourself and evaluate these critically to help you understand this study unit. Repeat the test as often as you wish. Note that the answers are provided by McGraw Hill and have not been verified by your lecturers at Unisa.

Reflection

Take some time to reflect on the content of this study unit. Road building and infrastructure development projects are plentiful in South Africa at the moment. Compare the projects you see around you with a pure operations management effort in banking or beer brewing, for example. Given what you know now, would you want to follow a career in project management? Do you think it would be easier to manage projects in some industries than in others?

SUMMARY

In this study unit we dealt with the art, need, nature and importance of project management as a unique management discipline. We noted that project management applies to any temporary and goal-oriented activity (in different environments and with different forms of organisational structures). It is clear that the need for project management becomes more pressing as the magnitude, complexity and importance of the project increases. Finally, we investigated the interrelationship between project management and operations management, and concluded that it should not be adversarial but rather mutually supportive.

In study unit 2 we will elaborate on the need for project management in terms of the project management dynamics.

Study unit 2

Project management philosophy and dynamics

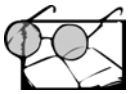
KEY CONCEPTS

- special kind of work
- parallel execution of work
- project management philosophy
- project integration management
- nature of projects
- organic nature of project management
- multidirectional flow of work

OVERVIEW

In this study unit we look at why project management is considered to be dynamic. This study unit should help you to grasp the concept of project dynamics and sets the scene for the study units which follow. Included in our discussion is the concept of a project management philosophy and reasons why project management is dynamic (ie project conflict, project synergy, parallel execution of work packages, the ironies of project management and the very challenging objectives of project management).

2.1 THE PROJECT MANAGEMENT PHILOSOPHY



Study the material which follows.

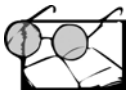
A philosophy is a body of thought about a topic or, alternatively, it describes how we should go about thinking about a topic. What should we think of project management? This depends on the fundamental nature and reality of what project management really is. A study of the theoretical basis of project management is important to describe this philosophy. The characteristics of a project and the role of the project manager provide a set of theoretical truths about project management. Is it an art or is it science?

The following truths may guide us in our thinking. Projects are unique; clear in their objectives; temporary in nature; cross functional; subject to multiple risks; and challenging in terms of cost, schedule and performance. What of the role of the project manager in all of this as he or she deals with non-routine work, the need to be innovative, the need to be creative, constantly seeking synergy with cross-functional teams and personalities, defusing conflict and stress, and the multi-directional flow of work and communication. What of the dynamics? Based on the preceding discussion, this would most probably entail

- a performance-driven, unconventional and special kind of management (in the lexicon of the management sciences)

- a discipline of management that is agile, flexible, creative, demanding and very rewarding

2.2 WHY PROJECT MANAGEMENT IS DYNAMIC



Study the material that follows.

2.2.1 The nature of projects and project management explains its dynamics

In study unit 1 we introduced you to the dynamics of project management in terms of its importance and characteristics. In this section we elaborate further on the dynamics with respect to change, new occurrences, challenges, risks, conflicts and results. All these are inherently part of projects. Consider the following characteristics of projects:

- a defined start, a single purpose and a well defined end state
- complexity
- unique skills sourced from multiple professions
- high levels of unfamiliarity, uncertainty and risk
- considered, distinct project phasing

Project management has several transformation (input–output) value-adding processes. Each phase of the project life cycle has certain process groups and these process groups overlap. The integration effort required to do this is indicative of a dynamic that is unique to project management.

Many of the organisational structures used (discussed later in study unit 4) are unique to project driven organisations. Woven into these structures are the use of multiple professions; shared resources; and the parallel execution of work packages in an environment that is uncertain, challenging and increasingly complex. Also important are the use of project teams, a management by objectives (MBO) methodology and TCP constraints.

Added to the project management dynamic, which we must also consider, is the importance of accurate estimating (for contracting, planning and scheduling); the effects of learning; interpersonal and stakeholder relations; and constant change.

2.2.2 The availability of a special and established PMBOK®

Project management is a discipline with a strong foundation in a well-defined, well-documented and established body of knowledge ie the PMBOK®. Much of what is taught throughout the world in the field of project management is rooted here. The body of knowledge caters for the multi-skilling and adaptive mind set (or attitude) of project managers. There is therefore a strong emphasis within project management on both a hard and a soft skills set. The soft or human aspects such as team work (as opposed to working groups), interpersonal skills, leadership, cultural aspects and conflict management relate strongly to the field of organisational behaviour. The hard

skills include technical competencies and those addressed by the PMBOK® (ie project management methods, techniques, etc.).

Project managers must produce “project products”, bringing together information, labour and material in order to create a unique market offering (typical action verbs that are used for this are “construct”, “design”, “develop”, “plan” and “produce”). Within the ambit of formal project management training, the learning outcomes resulting from such effort need to be classified to test a working knowledge of the discipline based on the PMBOK®, its application (apply the principles and perform concrete project-related actions), comprehension (the ability to recognise information in other forms), analysis, synthesis and evaluation.

The PMI (Project Management Institute) states clearly that merely reading project management texts or articles do not make a project manager. Neither does a two-day scheduling course or one dedicated to the use of project management computer software. Besides a requirement for formal learning (as with this offering by Unisa), potential project managers require additional exposure by means of research, interviews, observation and (most importantly) practical exposure (eg national and/or international onsite project management experience). To obtain real benefit, learners are encouraged to go through a structured learning process and stimuli, to recall previous learning, to obtain practical project management exposure, to obtain feedback and to assess their performance critically.

2.2.3 Projects are powerful and can be used as strategic instruments

Corporate strategies are high-level, long-term and medium-term plans designed by senior managers to bring on financial success by way of increased market share, access to new markets and increased industry competiveness. In many instances, launching new projects is used by senior management as a vehicle or instrument for strategy implementation and execution. Projects therefore are not implemented or conducted on a whim; instead, each and every project that a company has must contribute to a greater or lesser degree to the company’s overall mission and vision – and therefore also to its strategic goals. The use of project management is not restricted to profit-seeking organisations, but includes organisations without any profit-seeking motive (including government). Consider as an example the massive projects undertaken within the sphere of national defence (eg the South African defence acquisition deals) and infrastructure (eg the Katse Dam and the Gautrain). From the government’s perspective, such projects provide no financial gain for them (endemic corruption practices aside) yet they do provide security and increased prosperity for the people of the country they represent. Projects need not always have a tangible output or product (eg a bridge, a highway or a dam) but can also be directed at intangible issues or processes (eg improved productivity, reduced scrap, responsible disposal of toxic waste, increased customer satisfaction or the implementation of new operating systems).

We shall take a closer look at the strategic issues and project selection in study unit 3.

2.2.4 Project ironies

Many people are of the opinion that it is negative thinking to expect things to go wrong on a project. Others (especially experienced project managers) say that it is realistic, especially if one considers the typology of projects (the plot of project complexity versus uncertainty – see again figure 1.1 of study unit 1). Complex projects with multiple activities, large project teams and limited resources provide a very fertile environment for things to go wrong. Although the reasons are many, the degree of dependency between separate activities on a project is arguably the single most important cause. A delay on one activity will very quickly have a ripple effect on many other activities and soon thereafter the entire project.

The American Production and Inventory Control Society (APICS) have listed some "laws of project management" which give a very truthful, albeit humorous, indication of how uncertain project management can be:

- No project is ever on time, within budget or completed with the same human resources that started it.
- Project termination is very important since projects remain at 90% complete forever.
- When things are going well (the project is on schedule, within budget and specification), something will go wrong.

2.2.5 The organic nature of projects

The integration of resources into a project is dynamic in nature and central to project management. Cross-functional teams are common practice and the co-ordination of the multi-directional flow of work and communication is crucial. (You will study cross-functional teams more closely in study unit 14.) Project management is characterised by communication both up and down and across the formal organisational structures. In order to do this, the project manager may act in a variety of functional roles (ie as integrator, expeditor or manager).

To be organic, all project organisations must have two properties:

(1) They integrate sub-units by using horizontal relations.
(2) They have organisational structures that are differentiated to suit the unique requirements of each project and its environment.

We address these two properties more comprehensively in study unit 4 (Organisational structure and culture).

"Organic" in this case must be understood by its dictionary definition: forming an integral part of the whole or having different parts that work together.

Checklist

After completing this study unit, you should be able to explain

- the need for project management and the reasons why it is regarded as the method of the future

- why project management is dynamic
- what is meant by “the organic nature of projects”

Reflection

The only constant in life is change. Some would argue that dealing with constant change is at the very heart of project management. Would you be comfortable working in such a dynamic, ever-changing environment, where by implication you can never really be “on top” of the job? Do you have the energy levels required?

Are you comfortable working with other people and directing their efforts? Are you prepared to work longer hours and even weekends on “your project” when things get critical, which they certainly will? Remember also that projects do not execute themselves, but require the constant attention of the project manager to get – and to keep – the project momentum going.

SUMMARY

In this study unit we discussed an additional element of project management that is not normally discussed and yet is strongly implied in the contemporary project management textbooks, namely the project management philosophy. This provides us with some reasons as to why project management is considered dynamic. In study unit 3 we will investigate project management from the strategic perspective, seeking answers to the questions:

- What do organisations want to achieve with each new project they implement?
- Which factors should they consider in their deliberations?

TOPIC 2

The project management organisation

Aim

All tasks undertaken by either individuals or organisations are always conducted with a specific purpose in mind, no matter how strange or illogical these may sometimes seem to an external observer. Stated somewhat differently, all that we do as individuals and organisations is directed towards a desired outcome. For every effort (input), we seek an output (result). This implies that any desired result flows from a deliberate, cognitive decision-making process, irrespective of whether the process itself takes microseconds or years.

In a corporate context, projects are often launched in a focused search for a specific outcome and utilised as just one of many tools available to management in the process of corporate strategy execution. However, deciding on the use of project management demands consideration of some important issues.

In this section we explore these issues and attempt to answer the following three questions:

(1) Which factors must we consider before launching a new project? A strategic go/no go decision must be made.
(2) If the answer to the above question is go, how should we organise and structure ourselves to successfully execute the project(s) we have chosen to implement?
(3) What are the cultural influences of our organisation on our chosen project(s)? How influential are they in getting the work done? What must we change or adapt to become more effective?

LEARNING OUTCOMES

When you have worked through this topic, you should be able to

- explain what organisational needs identification entails and how strategic project selection occurs
- distinguish between the various types of project organisations (functional, project and matrix), and explain the advantages and disadvantages of each type
- Discuss organisational culture, its dimensions and identifying characteristics, and how these facilitate project execution

Topic study units

Study unit 3: Organisational strategy and project selection

Study unit 4: Organisation structure and culture

Study unit 3

Organisational strategy and project selection

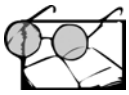
KEY CONCEPTS

- implementation gap
- net present value
- organisation politics
- payback
- priority system
- priority team
- project portfolio
- project screening matrix
- sacred cow
- scenario planning
- strategic management process

OVERVIEW

With few exceptions, most project organisations in South Africa today have either a functional or a projectised structure. Irrespective of their structure (in the present or future form), reaching a decision regarding which potential projects to follow is the starting point. Selecting the "right" projects, especially in project-driven organisations, often takes on major strategic importance and therefore enjoys executive management attention. In this study unit we discuss the strategic project management considerations: project portfolio management and project selection.

3.1 STRATEGY IS IMPLEMENTED THROUGH PROJECTS



Study pages 23 and 24 of Larson and Gray.

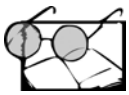
Formulating strategy is fundamentally about deciding how the organisation will compete in its chosen marketplace. An enterprise that is competitive in its chosen market(s) will have a stream of projects flowing through it continuously. An organisation's executive management (in their role as strategy formulators) will seek to balance multiple projects (the organisation's project portfolio) across the various stages of the project's life (ie from definition through to closing). For example, if an organisation presently has four of its five projects in work in the closing stages of the project life cycle, it is possible that it might soon suffer because of overcapacity in resources (equipment and personnel) and that there might be some retrenchments in the near future. Financial investors in the organisation, who stand outside the organisation looking in, might view the

situation pessimistically and conclude that future earnings for the organisation look uncertain.

Project managers and company senior executives cannot sit and wait for projects to come to them. Although the daily tasks of a project manager demand his full attention, he should be constantly alert for new opportunities (ie project add-ons. Project add-ons should not be confused with project scope creep. Although we deal with the problem of scope creep later, you are advised to quickly peruse pages 105 and 475 of Larson and Gray at this point.) Since very few individuals are closer to a project than the project manager, he or she is often ideally placed to identify new opportunities. Two aspects must be kept in mind: firstly, any additional work that might flow from the new opportunities must be aligned with the organisation's strategy and, secondly, any additional work must **only** be conducted by amending an existing contract or by initiating a new project.

Projects may be categorised as internal or external. External projects have a client that is external to the organisation and who, in a commercial relationship, pays for the product or service which the project delivers; and the client therefore provides a revenue (income) stream for the project organisation. The strategic importance of external customers is obvious. The strategic importance of internal customers can be equally or even more important, although this fact is not as obvious. Internal projects have the organisation itself as a client and therefore do not provide a revenue stream. An internal project is considered a user, and not a provider, of company funds – which is often the reason why executive management is hesitant to commit to internal projects without long deliberation. You might recall from other studies that a fundamental aspect of strategic thinking is that an organisation develops and maintains a distinctive competitive competency (a process, product or capability) which ensures for them a superior position in a competitive marketplace. Such competency is usually developed from within (ie via internal, company-funded projects). Efforts to improve the company's reputation, promoting participative management, eliminating a quality problem, basic research and development, or new product development can all be regarded as internal projects with major strategic implications. Many large organisations will often launch internal projects to win external projects (ie form a temporary project bid team or project office to prepare commercial offers in order to participate in large competitive bids). You may recall that this approach was used in the example from the chapter entitled "Project management in perspective". From the preceding argument, you must conclude that internal projects should not be viewed as less important than external ones.

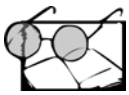
3.2 THE STRATEGIC MANAGEMENT PROCESS



Study pages 24 to 30 of Larson and Gray.

In this section we explore the strategic management process from a review of the organisation's strategic mission to selection of projects which will fulfil their desired mission. Study figure 2.1 (page 27 of Larson and Gray) and make sure you understand the four activities of the strategic management process.

3.3 PROJECT PORTFOLIO MANAGEMENT

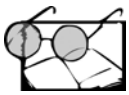


Study pages 32 to 42 of Larson and Gray.

All organisations are faced with a selection of strategic options (in this case, deciding which projects should be considered for selection, why and why not). Are there some projects we must implement whether we wish to or not? How do we make such decisions? Which criteria do we use in our decision making?

Make sure you understand the purpose of a portfolio management system and how it works. Consider any project you may wish to undertake and reflect on the questions posed in exhibit 2.4 (page 40 of Larson and Gray). Ensure that you are able to draw up a screening matrix as shown in figure 2.3 (page 41 of Larson and Gray).

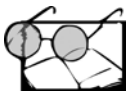
3.4 PROJECT SELECTION



Study pages 42 to 47 of Larson and Gray.

Project management is about risk management. Project risks are reflected in the new project selection criteria through careful consideration of many aspects, not only the strategic ones as discussed in the previous paragraph. Financial performance, legal and ethical considerations, and market conditions are but a few of these. Ensure that you understand the project screening process and the priority analysis (see figures 2.5 and 2.6 on page 46 of Larson and Gray).

3.5 MANAGING THE PORTFOLIO SYSTEM



Study pages 47 to 49 of Larson and Gray.

Managing a project portfolio (comprising a group of projects) is not a one-time effort; it requires constant effort and performance monitoring by the organisation's executive management team. They must ensure that the organisation's priorities and focus are maintained and that the project portfolio always meets the strategic needs of the organisation.

The project portfolio reflects the risk/reward appetite of an organisation's executive management. This may be plotted as shown in figure 2.7 in Larson and Gray. Students who have previously studied marketing and/or strategic management will immediately recognise the similarities between the project portfolio matrix (figure 2.7) and the Boston Consulting Group's (BCG) matrix.

Management are therefore constantly engaged in a review process, balancing the projects in their portfolio in such a manner that they capitalise on the good ones, discard those which do not meet the criteria and maintain a balance between the rest.

Checklist

After completing this study unit, you should be able to

- explain how strategies can become projects
- make a summary of the four activities of the strategic management process with reference to the strategic management process (figure 2.1 in Larson and Gray)
- explain the purpose of project portfolio management with reference to the portfolio of project types (figure 2.2 of Larson and Gray)
- describe the project selection process by screening (figure 2.5 of Larson and Gray)
- show the risk–reward relationship with a project portfolio matrix (figure 2.7 of Larson and Gray)

EXERCISE

Complete the following exercise to verify your understanding of the subject matter.

This exercise is suggested for your own study purposes only and is NOT REQUIRED for submission to Unisa.

Load the student resource CD-ROM for the fifth edition of *Project management: The managerial process* by Larson and Gray. Select "Online Learning Centre" and then "5e. Online Learning Centre website". Select "Student Edition" and then "Chapter 2" from the dropdown menu. Choose "Multiple Choice Quiz" and complete all 15 questions.

E-mail the results (answers) to yourself and evaluate these critically to help you understand this study unit. Repeat the test as often as you wish. Note that the answers are provided by McGraw Hill and have not been verified by your lecturers at Unisa.

Reflection

The theory presented above indicates that it is vitally important that organisations put a lot of effort into strategic thinking before committing themselves to a particular project. Unfortunately, organisations – much like human beings – often do not follow such a rigorous process and end up making expensive and painful mistakes. You might laugh at this fact, but consider the following: How much effort did you put into considering whether this subject (PRM3701) was the correct one for your career aspirations before you committed 120 nominal hours to it? Yes, 12 subject credits = 120 hours of effort (minimum). Perhaps you are now saddled with a "project" which is not aligned with your personal vision and mission, but which you are committed to complete. Not so funny anymore is it? Gotcha!!!!

SUMMARY

In this study unit we reviewed the relationship between an organisation's need for project selection (ie the project portfolio) and the requirements of effective

strategic management. In the next study unit we will look at how an organisation may structure itself internally in order to achieve its project and strategic aims.

Study unit 4

Organisational structure and culture

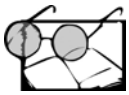
KEY CONCEPTS

- balanced matrix
- dedicated project team
- matrix
- organisational culture
- projectitis
- projectised organisation
- project office (PO)
- strong matrix
- weak matrix

OVERVIEW

In the previous study unit we stressed the importance of selecting the correct projects to pursue based on the organisation's strategic priorities and other essential selection criteria. Once defined, these new projects demand an appropriate organisational design. In this study unit we review both the organisational structures and the organisational culture through which the chosen project must be executed.

4.1 PROJECT MANAGEMENT STRUCTURES



Study pages 65 to 77 of Larson and Gray, and the text which follows.

From their study of other subjects, from school or perhaps from actual working experience, some students might be familiar with functional organisational structures (see figure 3.1 of Larson and Gray). Since good project management requires the formation of dedicated project teams (see study unit 14), these can only be effective in projectised or matrix organisational structures. Ensure that you understand the three main organisational structures (functional, matrix and projectised) and the variations of each in terms of their design, advantages and disadvantages.

The figures used by Larson and Gray to illustrate the various forms of organisational structure may be confusing to some students. Below are simplified versions redrawn from the PMBOK® (4th edition, 2008, figures 4.1 to 4.5). Note that there are some subtle differences between a structure with dedicated project teams and the projectised organisation structure. Do not confuse the two.

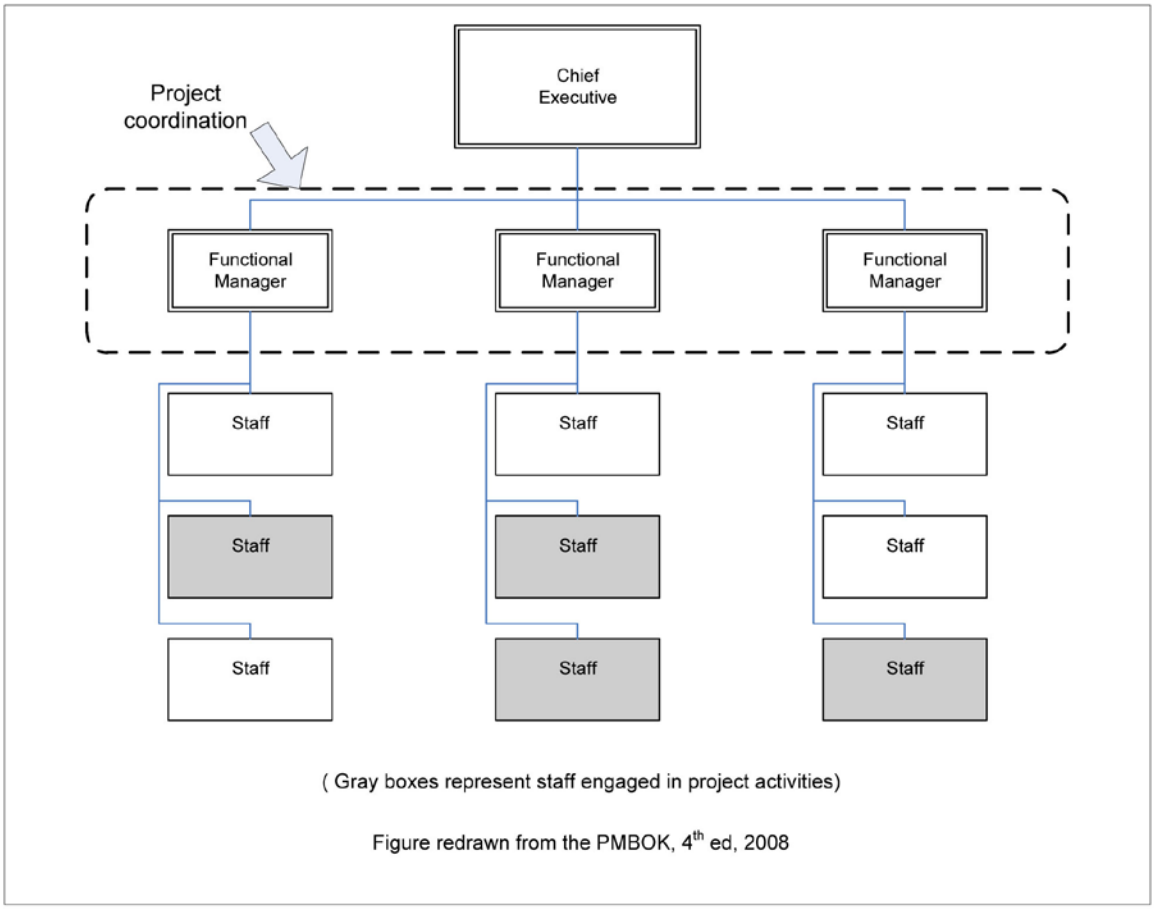


Figure 4.1

A functional organisation

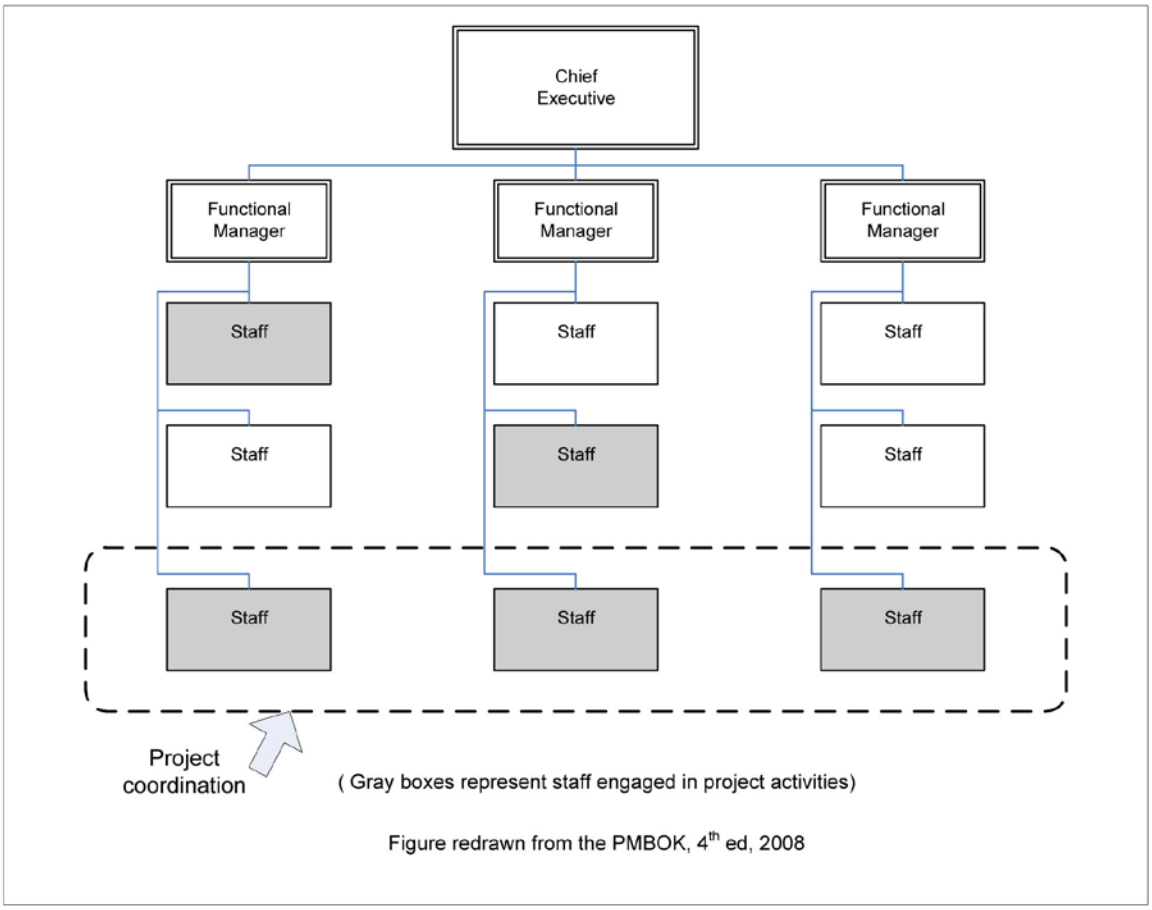


Figure 4.2

A weak matrix organisation

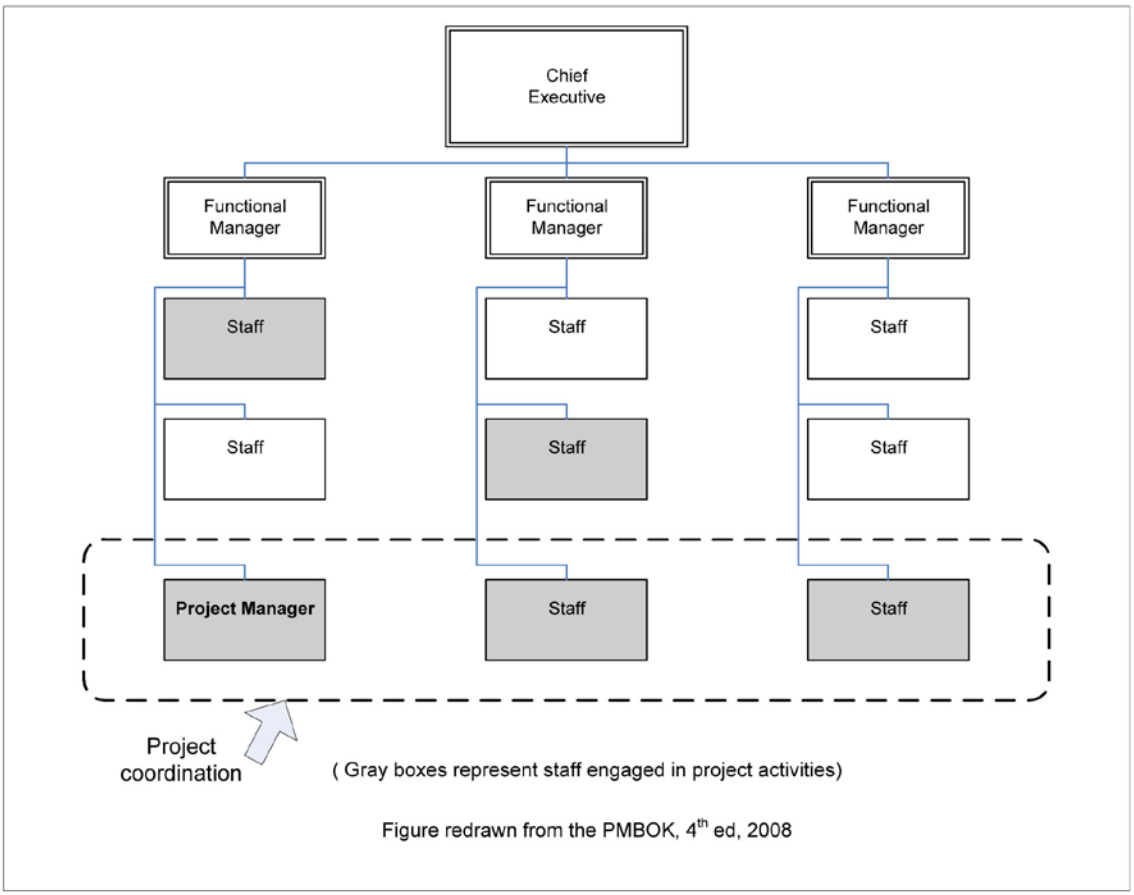


Figure 4.3

A balanced matrix organisation

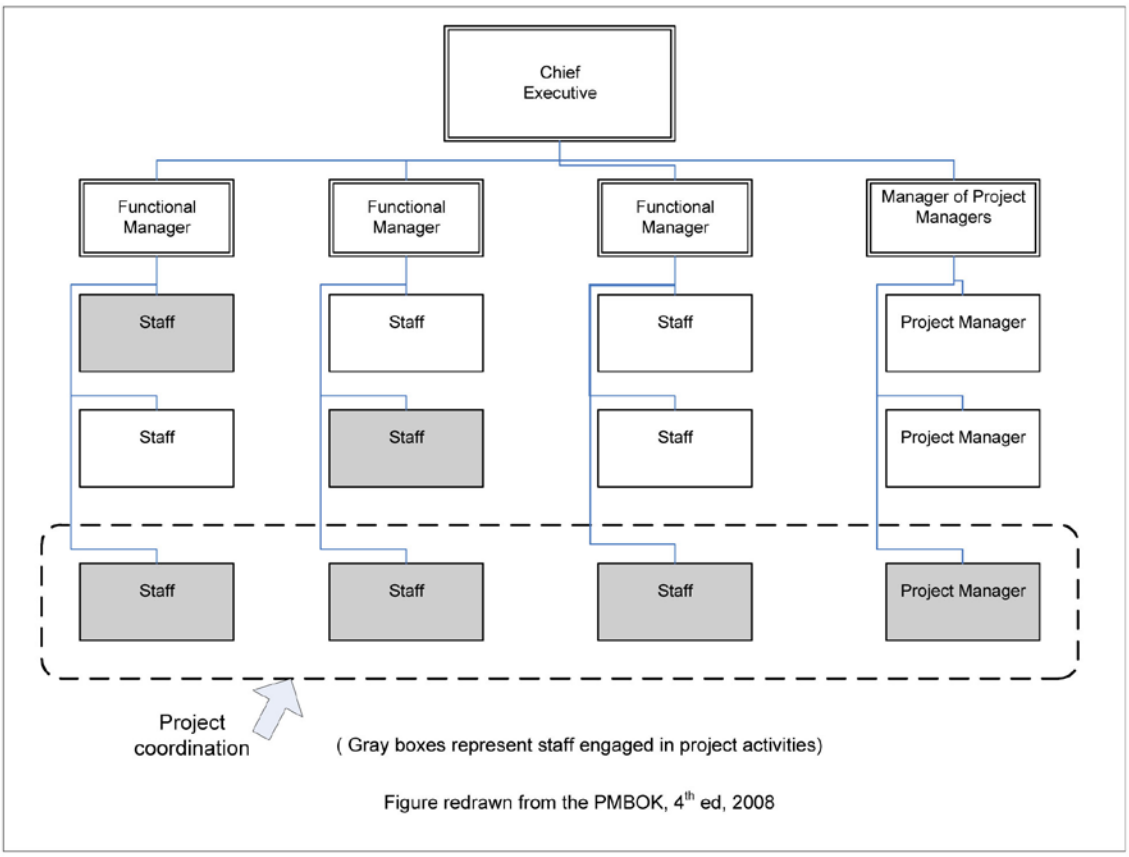


Figure 4.4

A strong matrix organisation

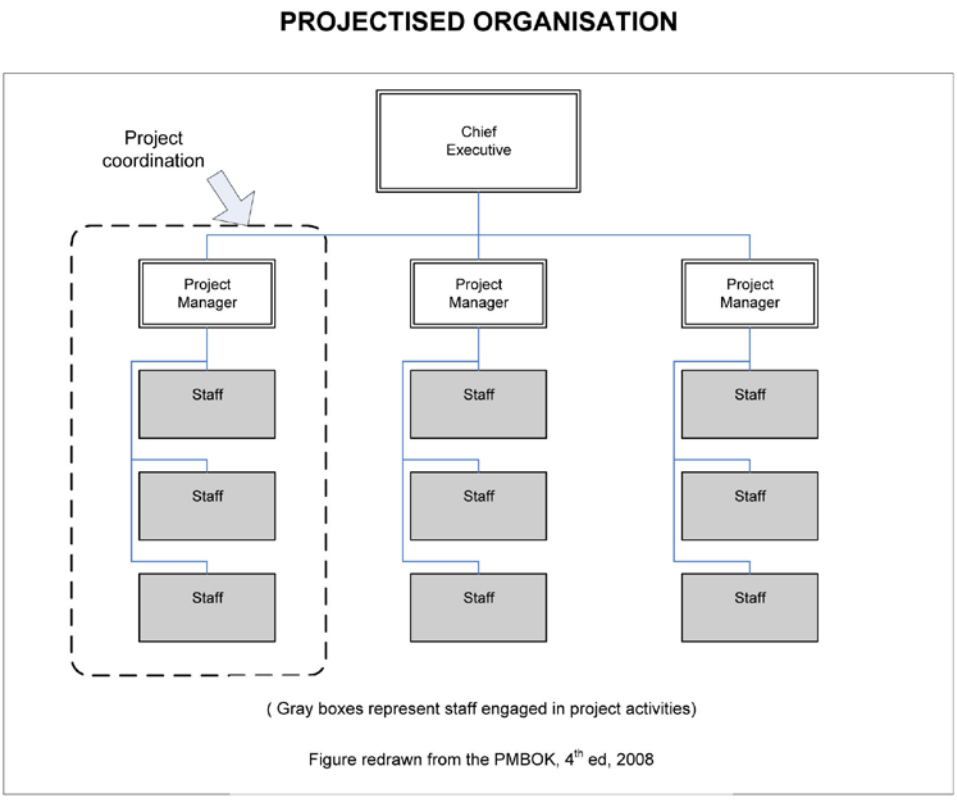


Figure 4.5

A projectised organisation

The organisational structure can affect the availability of project resources and influence how projects are executed. Table 4.1 below shows the project-related characteristics of the major types of organisational structure.

Table 4.1

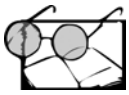
Organisational influences on projects

Organisational structure →	**Functional**	**Matrix**			**Projectised**
Project characteristics ↓		**Weak matrix**	**Balanced matrix**	**Strong matrix**	
Project manager's authority	Little or none	Limited	Low to moderate	Moderate to high	High to almost total
Resource availability	Little or none	Limited	Low to moderate	Moderate to high	High to almost total
Who controls the project budget	Functional manager	Functional manager	Mixed	Project manager	Project manager

Project manager's role	Part-time	Part-time	Full-time	Full-time	Full-time
Project management administrative staff	Part-time	Part-time	Part-time	Full-time	Full-time

(Source: redrawn from the PMBOK, 4th ed, 2008)

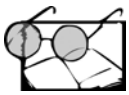
4.1.1 What is the correct organisational structure?



Study pages 77 to 79 of Larson and Gray.

There is no "one size fits all" answer to this question. While the matrix structure has become universally associated with project management, it does not suffice in all circumstances. The most appropriate structure balances the needs of both the organisation and the project. Students should note that if an organisation has a portfolio of projects in work, multiple forms of organisational structure may be found (depending on the importance and complexity of each project). Ensure that you understand the considerations which drive the form of organisational structure.

4.2 ORGANISATIONAL CULTURE



Study pages 79 to 87 of Larson and Gray.

Organisational culture comprises largely the soft issues in project management which so often frustrate the "technocrats" among us – those engineers, programmers, scientists and others who generally do not have to co-operate with others too much on a daily basis in order to get things done. Do not be fooled! An inappropriate or dysfunctional project–culture fit can easily break a project. Culture may be considered the personality of the organisation, a predictor of corporate behaviour. To illustrate the importance of this "organisational personality", consider working daily with an individual with whom you have a personality clash. Do you find it difficult or almost impossible to work productively with this person? Imagine then doing so on a daily basis when you are responsible for a project. It is most important that you understand the characteristics of a corporate (organisational) culture. Compare figure 3.5 and figure 3.7 in Larson and Gray, and ensure that you are able to identify a corporate culture which is supportive of projects.

Note that there is often some congruence in corporate culture between the project and client organisations (ie an intercompany cultural fit). Consider as an example the global defence industry, which is a prolific user of project matrix structures. Many of the defence industry's senior and executive management personnel are former or retired military personnel who bring with them (to their new civilian employers) a deeply entrenched military culture and way of doing things. A strong respect for established

hierarchies and an autocratic management style are indicative of the military culture. At first glance, this may seem the antithesis of good project management (eg open communication and teamwork) but it does bring an instant rapport with many project stakeholders (eg the users or customers, government agencies, foreign military officials and other potential clients).

Checklist

After completing this study unit, you should be able to

- compare the various project management structures used
- make an informed choice of which structure is the most appropriate in a given case
- explain the importance of organisational culture in project management

EXERCISE

Complete the following exercise to verify your understanding of the subject matter.

This exercise is suggested for your own study purposes only and is NOT REQUIRED for submission to Unisa.

Load the student resource CD-ROM for the fifth edition of *Project management: The managerial process* by Larson and Gray. Select "Online Learning Centre" and then "5e. Online Learning Centre website". Select "Student Edition" and then "Chapter 3" from the dropdown menu. Choose "Multiple Choice Quiz" and complete all 15 questions.

E-mail the results (answers) to yourself and evaluate these critically to help you understand this study unit. Repeat the test as often as you wish. Note that the answers are provided by McGraw Hill and have not been verified by your lecturers at Unisa.

Reflection

Refer back to figure 3.7 on page 85 of Larson and Gray. Consider the following:

- How might this figure be amended to reflect an operational management environment?
- How does the organisation you presently work for rate on this scale?
- Do you think the ratings would be similar for profit and non-profit organisations (eg a government department)?

SUMMARY

In this study unit we introduced you to the crucial aspects of organisational structure and organisational culture. The impact of culture on project success is most important and cannot be overemphasised. We will revisit the impact of organisational culture on projects in study unit 13 (Leadership).

TOPIC 3

Defining and planning projects

Aim

In the introduction to this subject, “Project management in perspective”, we stated that the discipline of project management may be broken down into two main subsections: the hard and the soft activities of project management. In this topic we introduce you to the hard activities. At the very highest level, projects may be defined and planned as a cognitive process of decision making, formalising the decisions in a series of documents, and then communicating them to the other project stakeholders (and especially the project team), thereby providing them with a road map which they can follow for project execution (project execution is the subject of topic 4).

Much like general accounting processes which provide balance sheets and income statements as outputs, the project management processes of definition and planning provide project management outputs such as statements of work (SOWs), work breakdown structures (WBSs) and many others. Collectively, these documents make up the project plan (or project master plan).

Because the defining and planning activities are difficult and time consuming to do well, they are often not done comprehensively enough. This failure to plan is often akin to planning to fail, especially in the South African project scenario. It may be argued that the Gauteng Toll Roads debacle resulted from a failure to consider (plan) stakeholder reaction; equally so, the school textbook delivery project in Limpopo Province was a complete failure to plan the logistical requirements despite the political disinformation. This reinforces the reality that properly defining and planning each project is a critical element of success.

LEARNING OUTCOMES

When you have worked through this topic, you should be able to

- distinguish between the project objective, the work breakdown structure and the responsibility matrix; and explain the role of each in project planning
- explain how activities are defined and the network plan is developed
- explain how activity duration estimates are made and establish activity start and finish times
- conduct project schedule calculations using practical examples
- illustrate how risks for the project may be managed, including risk identification, assessment, risk response planning and risk monitoring
- discuss project cost estimating and how to compile a project budget
- explain what resource constrained planning entails

- explain the purpose of project cost planning
- explain the importance of project documentation and change control

Topic study units

Study unit 5: Defining the project

Study unit 6: Estimating project times and costs

Study unit 7: Developing a project plan

Study unit 8: Managing risk

Study unit 9: Scheduling resources and costs

Study unit 5

Defining the project

KEY CONCEPTS

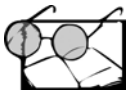
- cost account
- milestone
- organisational breakdown structure (OBS)
- priority matrix
- project charter
- responsibility matrix
- scope creep
- scope statement
- work breakdown structure (WBS)
- work package

OVERVIEW

The formal definition of a project (page 5 of Larson and Gray) indicates that all projects have an established objective. Projects without clear objectives result in much confusion and infighting between the project stakeholders, enormous stress for the project manager and his team, and ultimately lead to project failure. Defining the project and the project objectives takes time and much deliberation but is always time well spent. Unfortunately, many organisations and their project teams neglect this planning effort and launch into the project almost immediately, ultimately proving the ancient Chinese dictum "if you don't know where you are going, any road will get you there". Alternatively we could say that those who fail to plan, plan to fail.

Unfortunately, South African industry in general has a long history of not giving enough attention to defining and planning their projects compared to European and Asian industry. This has a strong detrimental effect on both our productivity and our international competitiveness. Note that our strong "*'n boer maak 'n plan*" national culture (whereby we "wing it" and deal with issues as they arise) is not always the asset it is perceived to be. Good project management requires good project definition and good planning.

5.1 DEFINING THE PROJECT



Study the material which follows.

At the most simplistic level, all projects are launched to satisfy a client need, either internal or external to the organisation. Failure to satisfy this need is by implication failure of the project. Defining the project is therefore nothing else than

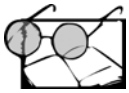
(1) reaching full agreement with the client on the requirement (the client's needs stipulated in terms of TCP)
(2) aligning the project organisation (the organisation which will do the work) to deliver on the requirement agreed to under (1) above

Defining the need (also referred to as "the user requirement") can be a very difficult task, especially in a high-technology environment such as aerospace, space exploration, defence and ICT. Some students may have been exposed to a discipline which is referred to as systems engineering. Systems engineering is a subset of project management which makes its main contribution in the definition phase of the project life cycle, redefining more accurately and in a well-established and understood format the user requirement of the client. For further discussion on systems engineering, interested students are referred to *Project management for engineers, business and technology* by Nicholas and Steyn and The International Council for System Engineering: SA Chapter at www.incose.org.za.

We reiterate at this point that the core aim of defining a project is to state exactly or as closely as is humanly possible what it is you want the project to achieve, documented formally as a user requirement. Ultimately, the project objective (project outcome) is derived from the user requirement. If the user requirement is not achieved, the project has failed.

Special note: The above argument highlights that a well-defined user requirement is an essential, even critical, input for project success. This is the traditional project management approach. Furthermore, the discipline of quality management teaches that it is the client who must specify clearly what he or she wants, and to which level of quality. A failure to do so creates a fertile breeding ground for problems to develop as the project progresses. However, there are instances where projects are launched without clearly stated objectives or user requirements. In such a case, the early stages of the project are exploratory and the objective is only defined (or becomes defined in incremental steps) as the project progresses, for example in IT development or R&D initiatives. This iterative approach is known by various names, including rapid prototyping and agile project management. A study of the details is beyond the scope of this course: you need only know that these methods exist.

5.2 THE FIVE STEPS TO DEFINE THE PROJECT



Study pages 101 to 116 of Larson and Gray.

In this section it is important that you understand the importance of defining the project scope, placing particular emphasis on the scope checklist. Note that the outcome of the scope checking process appears as a scope statement. The scope statement is more commonly referred to as a SOW in some industries. The PMBOK® (4th ed, 2008) defines the SOW as a "narrative description of products, services or results

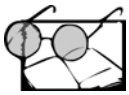
to be supplied". Make sure that you understand the concept of scope creep and its detrimental effect on projects if not managed effectively.

The WBS is one of the most important documents available to a project manager as it breaks down and defines the project scope into more manageable parts. The PMBOK® (4th ed, 2008) defines it as "a deliverable-oriented hierarchical decomposition of the work to be executed by the project team to accomplish the project objectives and create the required deliverable(s). It organises and defines the total scope of the project".

Note the integration of the WBS with the OBS in figure 4.5 on page 115 of Larson and Gray. The reasons for this will become more apparent when we discuss monitoring progress in study unit 11.

Put in more simple terms: the WBS defines the "what" of each project in much greater detail, whereas the OBS defines the "by whom" the work will be executed.

5.3 RESPONSIBILITY MATRICES AND THE PROJECT COMMUNICATION PLAN



Study pages 116 to 121 of Larson and Gray.

Small projects often do not warrant the time and effort of generating a WBS and an OBS. In such case, a simple responsibility matrix will suffice as long as it clearly defines what will be done and by whom. Note that the responsibility matrix neatly mates the functionality of a WBS (what must done) with an OBS (who must do it) in a greatly simplified manner. Interested students may want to read further on the use of a RACI chart (see http://www.tutorialspoint.com/management_concepts/raci_chart_tool.htm).

Lack of communication is often quoted as the source of many of life's ills. A project communication plan is established to manage proactively the flow of information between all stakeholders, thereby ensuring that all get the right information at the right time. In some companies, strict adherence to the communication plan is also intended to curtail the flow of uncensored project information outside the organisation. The intention of this act is not to be unethical or secretive towards other parties, but rather to ensure that the project organisation communicates with a unified, single voice (usually through the project manager or project champion as conduit). An interesting element that is not addressed in the prescribed textbook in the discussion of the project scope checklist is the flow of information to the client. If possible, the requirement and format of project status reporting to the client must be agreed upon before launching a project. Practical experience has shown that a client's unplanned requests for information can be very disruptive on projects already in work, sometimes tying up the project manager and other supporting staff for days on end. Such effort usually has not been budgeted for and soon results in cost overruns – they become an obscure form of scope creep (see Larson and Gray, page 475).

Checklist

After completing this study unit, you should be able to

- explain why so many project failures are caused by incomplete project definitions
- argue why we first require a complete scope of work (or user requirement) before deciding on project priorities and establishing a WBS
- elaborate on the six elements of a project scope checklist and why this should be as brief as possible
- explain the hierarchical breakdown of a WBS (figure 4.3 on page 108 of Larson and Gray)

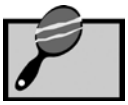
EXERCISE

Complete the following exercise to verify your understanding of the subject matter.

This exercise is suggested for your own study purposes only and is NOT REQUIRED for submission to Unisa.

Load the student resource CD-ROM for the fifth edition of *Project management: The managerial process* by Larson and Gray. Select "Online Learning Centre" and then "5e. Online Learning Centre website". Select "Student Edition" and then "Chapter 4" from the dropdown menu. Choose "Multiple Choice Quiz" and complete all 15 questions.

E-mail the results (answers) to yourself and evaluate these critically to help you understand this study unit. Repeat the test as often as you wish. Note that the answers are provided by McGraw Hill and have not been verified by your lecturers at Unisa.



Reflection

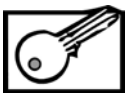
Compare what you have studied in this study unit with what you see happening around you every day. Do you believe South African industry is doing enough prior planning before starting new projects? Do we put enough effort into understanding properly what we want to achieve before starting something new?

SUMMARY

In this study unit we emphasised the importance of stating what the project should achieve (the project objective) and then defined this in more detail (what and by whom) using the WBS and OBS tools. In study unit 6 we take the process a step further by allocating times and costs to each WBS level in a logical way.

Study unit 6

Estimating project times and costs



KEY CONCEPTS

- apportionment
- bottom-up estimates
- Delphi method
- direct costs
- function points
- learning curves
- overhead costs
- padding estimates
- phase estimating
- range estimating
- ratio methods
- template method
- time and cost databases
- top-down estimates

OVERVIEW

Estimating the project times and costs (budgeting) is essential for the project management function of project control (a subject we will look at more closely in study unit 11: Monitoring progress). The estimate for time and cost at each level of the hierarchical breakdown of the WBS provides a baseline for measurement and, where deviations are evident, provides a trigger for management intervention and corrective action.

Although it is very important that a project manager understands the mechanics and techniques of the estimating process as discussed in this study unit, the estimating function itself is often a specialist function within many industries (eg defence, aerospace and construction) where complex projects with high contract values are the norm. Organisations that are active in these industries often have a dedicated bid office staffed by specialists with many years of practical experience in very specific disciplines. They often use the bottom-up estimating approach discussed in Larson and Gray.

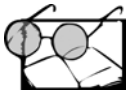
Note that Larson and Gray fail to make one aspect very clear – the activity of estimating project times and costs can take place both inside and outside the project that will execute the work. Also note the following:

- Large projects for external clients are only launched after a formal delivery contract has been signed by both parties. These contracts are only signed after much effort and negotiation by both the supplier (the contractor) and the customer. To arrive at

a selling price (contract price) and a promised delivery date, the contractor would have put in a lot of effort into **estimating project times and costs**. At this stage, much of the time and cost data will be available with the contractor but perhaps not in the format and detail the project will require. This, therefore, may be considered as estimating project time and cost effort outside the project since it takes place outside the project life cycle (ie before the project start of figure 1.1 on page 7 of Larson and Gray). Further note that the effort involved in preparing a commercial offer to a potential client can be so high that some organisations register internal projects which have as the deliverable (planned outcome) a commercial offer (sometimes called a tender, a bid or a proposal in some industries).

- Once a contractor has received the signed contract, there is a requirement to take up the time and cost data already available and to rework it into a format project management can use. Usually, this effort entails taking the high-level data and apportioning it to the lower levels of the WBS.

6.1 FACTORS INFLUENCING THE QUALITY OF ESTIMATES



Study pages 127 to 129 of Larson and Gray, and the material which follows.

From the previous discussion, you should see that it is critical for an organisation to get their time and cost estimates correct. Get this wrong and the project will soon be over cost (over budget) or behind schedule (late), and this will soon be followed by financial and project failure. Table 6.1 below contains other factors that influence good estimating and budgeting.

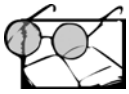
Table 6.1

Factors influencing budgeting and estimating

FACTORS INFLUENCING GOOD ESTIMATING AND BUDGETING	DESCRIPTION
Unethical behaviour of competitors	A very low bid signifies a desire to win a contract or subcontract (sometimes referred to as buying a contract).
Unforeseen cost increases (escalation)	Experienced estimators do not ignore this possibility; factors such as previous learning curves and the current macroeconomy should be taken into account.
Ego involvement of the estimator	The more emotion or ego is involved, the more unreliable the estimate.

FACTORS INFLUENCING GOOD ESTIMATING AND BUDGETING	DESCRIPTION
Uncertainty and lack of information	Haste and the use of weak research methodology affect the quality of data gathered.
Changes in design requirements	Change control systems and configuration management can reduce their influence, but a desire for "just one small improvement" or a change in mindset always has an effect on cost.
Economic and social variables in the requirement	Influencing factors beyond the control of the project manager often provide a good excuse. This, however, does not change the project manager's accountability.
Poor project management	Work efficiency, poor communication and loose control of cost packages (cost accounts).

6.2 ESTIMATING GUIDELINES FOR TIMES, COSTS AND RESOURCES

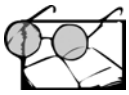


Study pages 129 to 131 of Larson and Gray.

Note the seven guidelines explained in Larson and Gray. Take special note of the text in italics. Because it is important, we repeat it here for emphasis:

- Estimates should be based on normal conditions, efficient methods and a normal level of resources.
- All task time estimates need consistent time units.
- Work package estimates should not include allowances for contingencies.

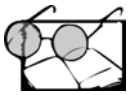
6.3 TOP-DOWN VERSUS BOTTOM-UP ESTIMATING



Study pages 131 to 133 of Larson and Gray.

Pay particular attention to table 5.1 (page 132 of Larson and Gray) and understand the conditions under which each methodology is preferred.

6.4 METHODS FOR ESTIMATING PROJECT TIMES AND COSTS

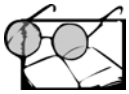


Study pages 133 to 141 of Larson and Gray.

Ensure that you understand the methods of both approaches. With respect to learning curves, note the following:

- Learning curves were developed by the US aircraft manufacturing industry in order to understand their bomber building processes during World War 2. When they are used as a management tool, they are only applicable to **high volume, repetitive operations** where the processes used to perform the work remain the same. The emphasis is on those processes which have a very **high labour content** because people do become better and more efficient when they repeat a task more often. Machines, in contrast, do not learn. Once a machine is set up to complete a specific operation, it continues to produce an output at a fixed rate.
- The application of learning curves can be a very complex science, the detail of which is far beyond the scope of Larson and Gray's textbook. You will not be required to perform any learning curve calculations for this course. A deeper study of learning curves is made in advanced courses in operations management.

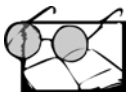
6.5 THE LEVEL OF DETAIL



Study pages 141 and 142 of Larson and Gray.

Note that the level of detail of work package information (time, cost and resources) is different for the different levels of management.

6.6 TYPES OF COSTS

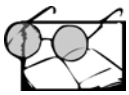


Study pages 142 to 144 of Larson and Gray.

A project manager is not an accountant but because he or she is ultimately responsible for the financial success of his or her project(s), it is crucial that he or she has a good understanding of both the financial and cost accounting fundamentals. Without these, how will the project manager know which questions to ask his or her team? How will he or she be able to converse with or report meaningfully to the project stakeholders? How will he or she recognise the onset of financial problems in the project?

Study figure 5.6 on page 143 in Larson and Gray closely and ensure that you are able to distinguish between the various costs (ie committed, actual and scheduled).

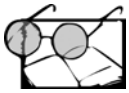
6.7 REFINING THE ESTIMATES



Study pages 144 to 146 in Larson and Gray.

Ensure that you understand the reason for further refining estimates after so much time and effort was invested in the first detailed estimate.

6.8 CREATING A DATABASE FOR ESTIMATING



Study pages 146 and 147 of Larson and Gray.

Anyone who has ever had to create an estimate had to ask “where do I start”? A previously completed estimate is usually a good place to start. The more complex the project that has to be undertaken, the more important it becomes to benchmark a new estimate against previous ones – both as a tool to reduce project risks and to ensure that the total quality (and accuracy) of each succeeding estimate improves.

Updating the estimation database is an essential task of finalising and closing projects (study unit 12: Project closure).

Checklist

After completing this study unit, you should be able to

- explain why estimating time and cost is important
- discuss the various methods used in estimating
- distinguish between the three views of cost by means of a figure (figure 5.6 in Larson and Gray)
- discuss the challenges to good estimating and budgeting, and suggest ways to overcome these

EXERCISE

Complete the following exercise to verify your understanding of the subject matter.

This exercise is suggested for your own study purposes only and is NOT REQUIRED for submission to Unisa.

Load the student resource CD-ROM for the fifth edition of *Project management: The managerial process* by Larson and Gray. Select “Online Learning Centre” and then “5e. Online Learning Centre website”. Select “Student Edition” and then “Chapter 5” from the dropdown menu. Choose “Multiple Choice Quiz” and complete all 15 questions.

E-mail the results (answers) to yourself and evaluate these critically to help you understand this study unit. Repeat the test as often as you wish. Note that the answers are provided by McGraw Hill and have not been verified by your lecturers at Unisa.

Reflection

The task of estimating accurately is arguably one of the most important and most responsible tasks in project management. Consider the following:

- If a contract estimate is too low, the contract price will be too low – which means that the project organisation will make a loss. Rarely, if ever, will an opportunity present itself to remedy such an error once a contract has been signed. Cost plus contracts are one exception (see study unit 15).
- If the estimate is too high, the organisation might (1) not win the contract or (2) close the contract and achieve exceptionally good profits. This second option is highly unlikely in a free, competitive business environment – unless fuelled by some corrupt practices.

Successful estimating is often very dependent on practical experience (time served in the trenches) and it is for this reason that many corporate estimating departments are staffed by the “old” hands.

SUMMARY

In this study unit we introduced you to the requirement for estimating project times and costs, and indicated why this is so important in project management. Many experienced project managers will report that there is ample opportunity during the project execution phase to regret inaccurate and/or incomplete estimating during the contracting or planning phase(s). In study unit 7 we focus on the development of a project plan.

Study unit 7

Developing the project plan

KEY CONCEPTS

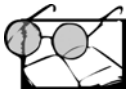
- activity
- activity-on-arrow (AOA)
- activity-on-node (AON)
- burst activity
- concurrent engineering
- critical path
- early and late times
- Gantt chart
- hammock activity
- lag relationship
- merge activity
- parallel activity
- sensitivity
- slack/float – total and free

OVERVIEW

The main thrust of this study unit is developing and setting up a project network as a central tool for defining and planning projects. The project network is an easily understood, graphical representation of the logical sequence of all activities in a project from start to finish. The project network is developed from the information taken from the WBS (see study unit 5) and is regarded by many project managers as the single most important management document they have on a project.

It is interesting to note that armchair project managers (those individuals familiar with a few project management buzz words and who are able to "drive" a desktop-based project management package) usually start planning their projects by drawing up a Gantt chart (Larson and Gray, page 176) without first considering what must be done, by whom or the interdependency of activities. We trust that by progressing this far in your studies, you will already have concluded that this is certainly not the correct way of doing things and that we first require a SOW, a WBS, an OBS and other related documents.

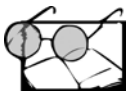
7.1 FROM WORK PACKAGE TO NETWORK



Study pages 157 to 159 of Larson and Gray.

Make sure that you understand how a network is developed from the basic work package (the lowest level in the hierarchical breakdown of the WBS). Study figure 6.1 and the supporting text which explains it.

7.2 CONSTRUCTING A PROJECT NETWORK



Study pages 160 to 177 of Larson and Gray, and the material which follows.

Study this section of the textbook comprehensively. Make sure that you understand the terminology used in networks and also the approaches. Drawing the networks with forward and backward pass, calculating the critical path, slack and free slack are all aspects which you must practice to become proficient. Complete the examples in Larson and Gray to do this. We will make some solved examples available to you as you progress with the course.

Note that two approaches are used to develop networks, namely activity-on-node (AON, also called the precedence diagramming method or PDM) and activity-on-arrow (AOA). Understand the differences between the two methods, including the following (Nicholas & Steyn 2012:228):

> AON networks are constructed without the use of dummies, so they are simpler and easier to construct and interpret than AOA networks; as a consequence, they are more popular. But because AOA diagrams use line segments (the arrows) to represent the flow of work and time, they can easily be converted into time-scale networks that look like Gantt charts. Some project software packages create time-scaled networks, and some create AOA and AON network diagrams. For a particular project, only one method should be used.

Although you must be familiar with both methods, only the AON method will be evaluated by means of worked examples. Students who have completed operations management courses at Unisa should already be familiar with the technique.

To assist students who have difficulty constructing an AON network, find below a seven-step procedure suggested by Steenkamp (2011:44).

(1) List all the activities/work packages of the project/subproject and the time duration of each.
(2) Indicate the follower or preceding activity (activities).
(3) Draw the network according to the sequence of activities by using lines between the nodes. The nodes (AON) represent the beginning and the completion of one entire activity. Use the following notation for each node:

ES	**ID**	**EF**
SL	**Description**	
LS	**Dur**	**LF**
	TS	

FS

ES = earliest start time
EF = earliest finish time
LS = latest start time
LF = latest finish time
TS = total slack (also SL in the table above)
FS = free slack
ACT = activity code (A, B, C, etc)
DUR = activity duration in days, weeks, etc)

(4) Determine the critical path. This is the longest route through the network when all the possible routes are followed from the beginning to the end of the network. Use the time duration of each activity to calculate the critical path. The path is crucial since the entire project and resource allocation will be based on it. The critical path may not be compromised and penalties may be applicable if the project is extended beyond the project duration as indicated by the critical path. The ES and LS times and the EF and LF times of activities on the critical path are the same (because there is **no slack on the critical path**).
(5) Slack may be available on activities which are not on the critical path. The way to calculate the slack is to work from left to right through the network (forward pass) by calculating the ES and EF times. If an activity has two or more predecessors, the activity with the largest EF will determine the ES of the follower activity since the activity may not start unless all preceding activities are completed.
(6) Work from right to left (backward pass) through the network by calculating the LF and LS times. If an activity has more than one follower, the smallest follower LS will determine the LF of the preceding activity (working from right to left).
(7) The difference between ES and LS is the total slack available at that activity before the total project will be delayed. Free slack (FS) is the amount of slack available before any follower activity will be disrupted/delayed. FS is calculated by taking the difference between the earliest (smallest) successor ES and the EF of the activity we are considering.

Take special note (1) that more than one critical path can exist in an activity network and (2) of the concept of sensitivity (ie how sensitive the critical path is to project changes). You will study the latter point further in study unit 10 (Reducing project duration).

Make sure that you understand and are able to draw a Gantt chart. The concept of the Gantt chart is more than 100 years old and is a familiar plot to most people, even those who are not trained in project management. The Gantt chart is the preferred starting point of project planning for those who are not trained in project management, usually using a simple commercial project management software program. We trust that you already understand at this point that, for effective project management, we must first have as a minimum a user requirement, a SOW, a WBS, an OBS and an activity network before we can even consider drawing Gantt charts. Moving straight to a Gantt chart without developing a WBS is good for only the simplest of projects and where there is little risk of omitting important activities.

7.3 EXTENDED NETWORK TECHNIQUES

Study pages 177 to 184 of Larson and Gray.

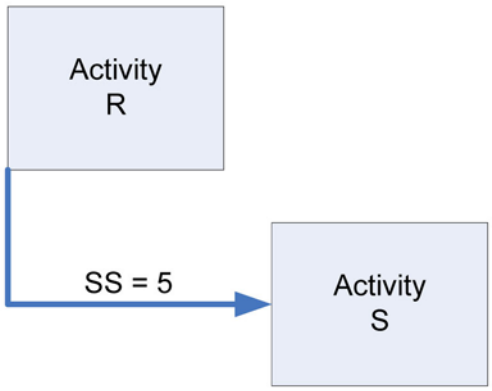
In the previous section we introduced you to activity networks where we assumed a finish to start relationship between activities (ie we assumed a preceding activity must be completed before we can start with the following one). Although this assumption is valid, it is not always representative of what happens on projects in reality. Study carefully the four basic dependencies between activities (repeated below for emphasis):

(1) finish-to-start (FS)
(2) start-to-start (SS)
(3) finish-to-finish (FF)
(4) start-to-finish (SF)

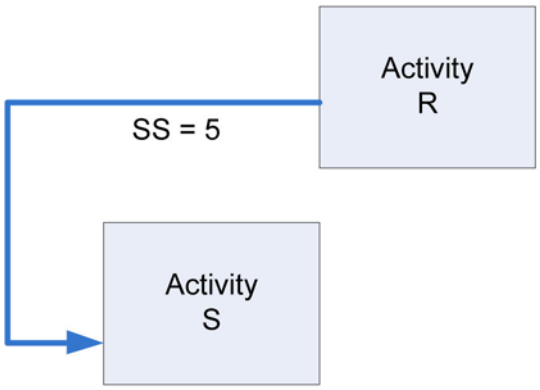
Note that Larson and Gray only discuss the use of lags, whereas other prominent works in project management will sometimes also refer to leads. The PMBOK® (2012:437) defines these as follows:

- **Lag**. The amount of time whereby a successor activity is required to be delayed with respect to a predecessor activity.
- **Lead**. The amount of time whereby a successor activity can be advanced with respect to a predecessor activity.

Figure 7.1 below indicates the lead–lag relationship between two activities.



(A) AON representation of a start-to-start relationship with a five day lag (activity S lags activity R)



(B) AON representation of a start-to-start relationship with a five day lead (activity S leads activity R)

Figure 7.1

Lead and lag relationships

Lead is the opposite (or mathematical negative) of lag (ie a –ve lead is equivalent to a +ve lag).

A lag should not be confused with slack (also called float). Lag is the amount of time an activity **must be delayed** for some technical reason, while float is the amount of time an activity **may be delayed** from its earliest start without delaying the project (Steyn et al 2008:102).

Figure 7.2 below may help you to understand the concept of free slack.

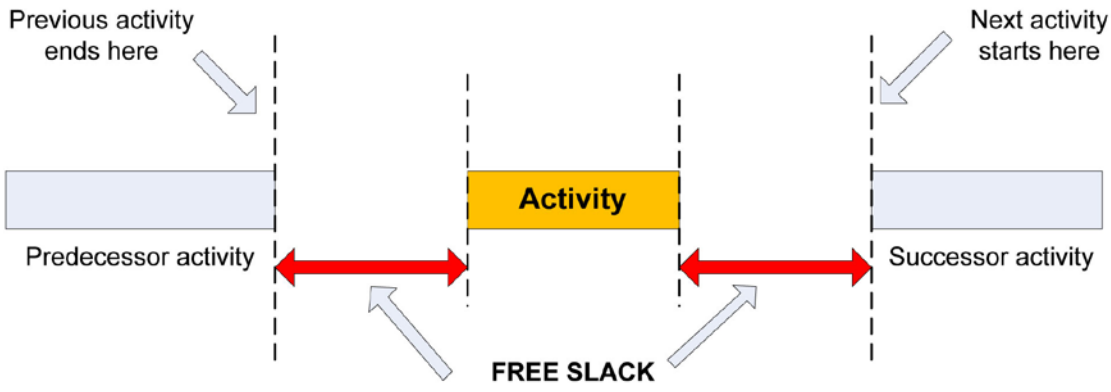


Figure 7.2

Free slack

Checklist

After completing this study unit, you should be able to

- list and describe the network terminology
- illustrate by means of a figure how work packages are used to develop a project network (using figure 6.1 in Larson and Gray as the foundation)
- construct a basic project network by using the AON method and showing ES, EF, LS, LF, TS and FS in your diagram
- draw a basic Gantt chart and show how it provides a visual impression of the planned work on a project
- list the forms of activity dependency, and show how leads and lags are incorporated into the network

EXERCISES

Complete the following exercises to verify your understanding of the subject matter.

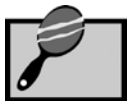
These exercises are suggested for your own study purposes only and are NOT REQUIRED for submission to Unisa.

Load the student resource CD-ROM for the fifth edition of *Project management: The managerial process* by Larson and Gray. Select "Online Learning Centre" and then "5e. Online Learning Centre website". Select "Student Edition" and then "Chapter 6" from the dropdown menu. Choose "Multiple Choice Quiz" and complete all 15 questions.

E-mail the results (answers) to yourself and evaluate these critically to help you understand this study unit. Repeat the test as often as you wish. Note that the answers are provided by McGraw Hill and have not been verified by your lecturers at Unisa.

Practice drawing project network diagrams by completing the following exercises:

- question 7 on page 187 of Larson and Gray
- question 8 on page 187 of Larson and Gray
- question 9 on page 188 of Larson and Gray



Reflection

Gaining a deeper understanding of the concepts presented in this study unit is not as easy as it would first appear. To help you, try and think of practical examples of everyday activities which must lead or lag one another. Try to think of these outside of a typical finish–start relationship.

SUMMARY

The project network diagram may the most important planning document available to project managers. However, once this effort has been made and the network diagram (or Gantt chart) becomes available, the project manager is able to see

clearly the sequencing and time phasing of all the project activities, and therefore also the work to be completed and the resources and budget that are required. In study unit 8 we focus on the risks for the project and the atmosphere of uncertainty in which the project must be executed.

Study unit 8

Managing risk

KEY CONCEPTS

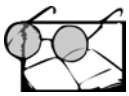
- avoiding risk
- budget reserve
- change management system
- contingency plan
- management reserve
- mitigating risk
- opportunity
- retaining risk
- risk
- risk breakdown structure (RBS)
- risk register
- risk profile
- risk severity matrix
- scenario analysis
- time buffer
- transferring risk

OVERVIEW

Project management is fundamentally about risk management. The deliberate act of seeking a project outcome by bringing together multiple resources in an environment full of diverse stakeholder interests invites risk. The potential always exists to avoid risk completely ie by not taking on any new projects. Doing this, however, is contrary to the entrepreneurial way of thinking. Putting our heads in the sand like an ostrich and imagining that the risks do not exist is not a viable option. Organisations must take risks to benefit from potential opportunities. All project risks must be managed (identified, understood and qualified, and an appropriate response developed). Conducting risk management is much like buying insurance; it is an action undertaken to lessen the negative impact of potentially adverse events on a project.

See again figure 2.7 of page 49 of Larson and Gray: the risk/reward trade-off of the project portfolio matrix.

8.1 THE RISK MANAGEMENT PROCESS



Study pages 211 to 230 of Larson and Gray.

It is important to understand that risk management is not a once-off process performed at the beginning of a new project, but rather an ongoing series of actions from project start to final closure. Note from figure 7.1 (page 212 of Larson and Gray) the importance of identifying and acting on risks as early as possible. While the chances of a risk occurring (as a result of stakeholder influence, risk and uncertainty) are very high during the early stages of a new project, the costs to fix these risk events (both in monetary terms and schedule delays) are comparatively low. Obviously, overcoming risks at an early stage and at minimum cost is the preferred course of action to follow. It will become apparent later in study unit 14 that good communication is also crucial here. A problem or risk that is well known at an early stage of the project but not communicated to those who are able to do something about it leaves little room for early, and therefore cheap, resolution.

Ensure that you understand all the aspects of the risk management processes as illustrated in figure 7.2 (page 213 of Larson and Gray). Note that the consequences of risks which have occurred are not equal for all risks for the project; therefore, not all risks merit or enjoy the same level of management attention. The consequences of the various risks are plotted on a severity matrix (figure 7.7 on page 218 of Larson and Gray). Nicholas and Steyn (2012:363) offer an alternative, more easily understood, plot as shown in figure 8.1 below.

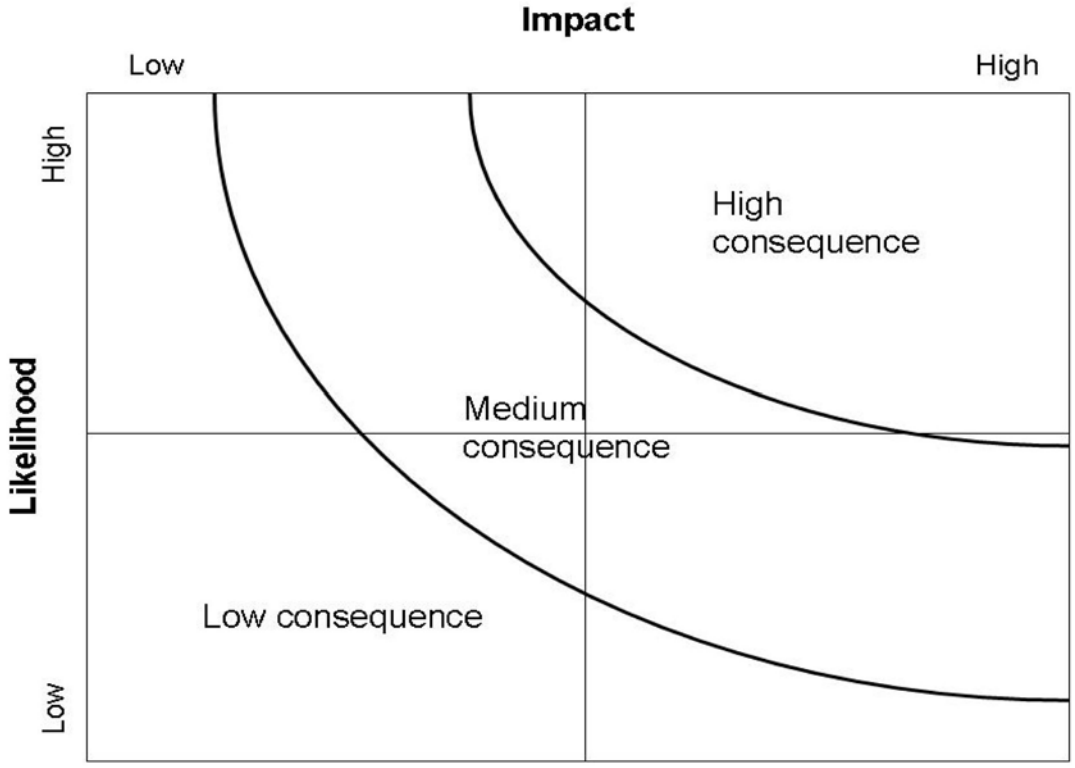


Figure 8.1

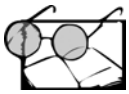
Risk as a function of likelihood and consequence

Undertaking any form of business or new project is inherently risky. Executive consideration of the full risk profile of any new project is very important and plays a crucial role in the final decision on whether or not to proceed. Refer back to study unit 3, figure 2.3 (page 41 of Larson and Gray), where we argued that consideration of the

project risk profile merits inclusion as a criterion in the project screening matrix. The risk–reward trade-off on new projects is a dominant factor in many cases. Consider for example the decision to engage in large commercial aircraft manufacture or perhaps treasure hunting, both of which reside heavily on the risky side of the risk–reward continuum.

When faced with risk, our first reaction is usually to mitigate it (reduce the likelihood or impact of the risk on the project). This is but one of many alternatives available to the project manager. Ensure that you understand the various risk response actions and when each may be appropriate.

8.2 CHANGE CONTROL MANAGEMENT



Study pages 230 to 234 of Larson and Gray.

There are many areas where a project can run astray; one major culprit is the failure to apply effective change control management. Projects, like people, are not static but evolve as a result of factors from both the internal and external environment.

Consider as an example of an external influence a client's failure to fully state their user requirement at the start of the project, but still insisting that the requirement be incorporated into the final project output. Incorporating the change may or may not be possible, and will nearly always have an impact (usually negative) on TCP. We determined from figure 7.1 (page 212 of Larson and Gray) that the later a potential change is made, the more severe its impact on the project. What is important to note is that the project must have a methodology to manage and control the changes. The project manager is always responsible for change control management, but the administration thereof (especially in engineering organisations) resides in a dedicated configuration management department. Note also that on large, complex projects change management and administration can quickly grow into a formidable task that demands the attention of dedicated individuals and sometimes even dedicated functional departments.

Checklist

After completing this study unit, you should be able to

- elaborate on the risk management challenge with the aid of a graphic model (figure 7.1 of Larson and Gray)
- describe the risk management process with the aid of a figure
- argue the importance of a change management control process

EXERCISE

Complete the following exercise to verify your understanding of the subject matter.

This exercise is suggested for your own study purposes only and is NOT REQUIRED for submission to Unisa.

Load the student resource CD-ROM for the fifth edition of *Project management: The managerial process* by Larson and Gray. Select "Online Learning Centre" and then "5e. Online Learning Centre website". Select "Student Edition" and then "Chapter 7" from the dropdown menu. Choose "Multiple Choice Quiz" and complete all 15 questions.

E-mail the results (answers) to yourself and evaluate these critically to help you understand this study unit. Repeat the test as often as you wish. Note that the answers are provided by McGraw Hill and have not been verified by your lecturers at Unisa.

Reflection

Can we eliminate risks entirely from our projects? Is it feasible to do so? How much do you think it might cost? If you consider your own life as a project, which risks have you eliminated, mitigated and just accepted?

Consider a new opportunity in terms of the reverse effect of risk. Can you think of any practical examples of this? To stimulate your thinking, consider how the modern post-it note resulted from a failed paper adhesive development project.

SUMMARY

No project plan is ever complete without consideration of risk. The organisational culture is very important in this respect (ie how tolerant is the culture of risk). Contrast the Virgin Group (led by the master entrepreneur Richard Branson) with the commercial banks in terms of their risk appetite. Risks must be recognised and not denied; problems must be identified and not hidden. Up to this point, we have defined and planned projects, taking cognisance of the risky environment within which they are executed. Our focus will now turn to scheduling project resources and costs – the subject of study unit 9.

Study unit 9

Scheduling resources and costs

KEY CONCEPTS

- heuristic
- levelling
- planned value (PV)
- resource-constrained projects
- resource smoothing
- splitting
- time-constrained projects
- time-phased budget baseline

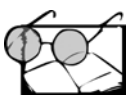
OVERVIEW

In the previous study units you learned how to estimate the duration of project activities with the fundamental assumption that the resources required to do the work are freely and instantly available, with no competition from other projects. Similarly, you learned to develop project networks based on a logical sequence of activities without considering the practical issues present in projects. This is unrealistic. In this study unit we introduce scheduling and the influence of constraints into the scheduling problem. Steyn et al (2008:89) state that scheduling is "**necessary to determine when work must be done and to communicate the information to determine what resources (manpower, equipment, facilities and funds) should be available at any specific time**". In support of this statement, Larson and Gray make two very important claims at the beginning of chapter 8 (repeated here for emphasis):

(1) Project network times are not a schedule until resources have been assigned (see sections 9.1 to 9.4 below).
(2) Cost estimates are not a budget until they have been time phased (see section 9.5 below).

Your efforts in this study unit will demonstrate the validity of these two statements.

9.1 THE RESOURCE SCHEDULING PROBLEM AND TYPES OF CONSTRAINTS



Study pages 253 to 257 of Larson and Gray, and the text which follows.

Note how resource and cost scheduling (the subject of this study unit) is one of the final two planning tasks in the project planning process as shown in figure 8.1 (page

253 of Larson and Gray). Because Larson and Gray are not clear on the content of a project master plan, we provide the explanation given by Nicholas and Steyn (2012:130) below.

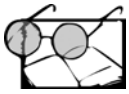
The project master plan includes:

- a scope statement or SOW that includes high-level user requirements and system requirements.
- a WBS and work packages or tasks.
- project organisation and responsibility assignments.
- assignment of key personnel to work packages.
- project schedules showing events, milestones or points of critical action.
- budget and allocation to work packages.
- a quality plan for monitoring and accepting project deliverables, including a testing plan.
- a risk plan and contingency or mitigation measures.
- a procurement plan.
- a work review plan.
- a change control plan.
- a documentation policy/plan.
- an implementation plan to guide conversion to or adoption of deliverables.

Can you see some correlation between the content of the project master plan and what we said in the overview of this study unit?

Larson and Gray refer to a process that is called resource smoothing (page 254). Note that this is the same technique referred to as resource levelling in the PMBOK® and other project management textbooks. Make sure that you understand resource constrained scheduling as described, and how resource dependency takes priority over technological dependency. Note the additional constraint over those already listed in figure 8.2 of Larson and Gray, namely the physical constraints described in the “Snapshot from Practice” on page 256. Understand the classification criteria for time-constrained and resource constrained projects (refer back to figure 4.2 on page 107 of Larson and Gray). Also note that in reality, projects may be both time and resource constrained; to manage these effectively requires some innovation and a “bit of magic” from the project manager.

9.2 RESOURCE ALLOCATION METHODS



Study pages 257 to 264 of Larson and Gray.

In this section resource allocation in time and resource constrained projects is discussed by using some basic (perhaps unrealistic) assumptions in order to enhance students’ understanding of the concepts. Work through figures 8.3 to 8.5 and make sure that you understand how resource levelling may be applied. Note that the optimum utilisation of resources is possible in mathematical models but in practice (and especially with computer software) project management makes use of heuristics

to assist in the decision-making process. While the answers provided by this method are perhaps not optimum, they do lead to good decisions.

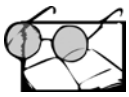
9.3 COMPUTER DEMONSTRATION OF RESOURCE-CONSTRAINED SCHEDULING

Read pages 264 to 272 of Larson and Gray.

Note the following:

- project management software capabilities.
- the impact of resource constrained scheduling.
- the implications of splitting activities (the multitasking facility women are apparently so very good at!).

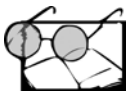
9.4 SCHEDULING RESOURCES AND ASSIGNING WORK



Study pages 272 to 275 of Larson and Gray.

When you study this section, pay particular attention to resource allocation in multiproject environments.

9.5 USING THE RESOURCE SCHEDULE TO DEVELOP A PROJECT COST BASELINE



Study pages 275 to 281 of Larson and Gray.

The discussion in this section concerns a statement made earlier in this study unit, namely: “cost estimates are not a budget until they have been time phased”. We look at the “how” element of time phased budgets (the “why” is discussed in study unit 11: Monitoring progress). The statement suggests that the purpose of time phased budgets is control, which is correct. If the budgeted costs are not time phased, there is no reliable way to measure performance. There is, however, another aspect which is not discussed by Larson and Gray but which we address briefly below.

There is a widely held perception (by the layman) in South Africa that companies have a lot of ready money available with which to instantly service unplanned expenditures and cost overruns. In reality, the financial management of companies is in most cases strictly controlled and expenditures (outflows) are planned for well in advance (budgeted) in order to ensure that the funds are available when required. Financial managers plan the monthly cash flow (inflows and outflows) of the business, which is why individual project managers are regularly approached to make cash flow forecasts for their project(s) each quarter, half year or so. From this information, they then ensure

that the company has free cash available when payments are due. Any project which deviates from the forecast upsets the cash flow plan (and the financial managers). This problem is exacerbated if the project has international connections, for example a foreign client or major supplier – a relationship which automatically implies foreign currency concerns. In this case, the financial managers may have taken out forward cover contracts (a form of insurance against exchange rate fluctuation), which may become compromised as a result of deviations from the projects cash flow forecast.

Ensure that you understand the project cost baseline (also called the planned value or PV), since this concept is very important in study unit 11. Note that the PV discussed here is the same concept as the scheduled budget first introduced in figure 5.6 on page 143 of Larson and Gray.

Checklist

After completing this study unit, you should be able to

- list all the elements of a project master plan
- explain the resourcing challenge and the various types of resource constraints
- explain the concepts of resource utilisation, levelling and activity choices
- develop a project cost baseline

EXERCISE

Complete the following exercise to verify your understanding of the subject matter.

This exercise is suggested for your own study purposes only and is NOT REQUIRED for submission to Unisa.

Load the student resource CD-ROM for the fifth edition of *Project management: The managerial process* by Larson and Gray. Select “Online Learning Centre” and then “5e. Online Learning Centre website”. Select “Student Edition” and then “Chapter 8” from the dropdown menu. Choose “Multiple Choice Quiz” and complete all 15 questions.

E-mail the results (answers) to yourself and evaluate these critically to help you understand this study unit. Repeat the test as often as you wish. Note that the answers are provided by McGraw Hill and have not been verified by your lecturers at Unisa.

Reflection

Consider a project you are familiar with. How might you increase/decrease your pool of available resources in the short term?

SUMMARY

In this section, we allocated resources to the project activities and developed the project cost baseline – two very important actions required to measure and evaluate progress (the subject of a study Unit 11). In study unit 10 we will investigate ways to reduce overall project duration (ie accelerating the closure of the project).

TOPIC 4

Executing and closing projects

Aim

In topic 3 we considered the definition and planning tasks required for any new project. In this section, we continue with the hard activities, considering what is required of a project manager to execute and close the project which had been planned. Previously, while the project was in the definition/planning phase (topic 3), the project manager was a visionary and a leader; now he is expected to change his main focus to one that is more aligned with the management and control functions. He is now more of a manager and less of a leader. **Do not become confused here**: The project manager is still expected to lead, but his main focus changes to a managerial one.

Practical experience in project management indicates that executing and closing a project are the most difficult phases of the project life cycle. It is here that all the milestones and deadlines are most evident and where the lion's share of the project budget is spent. These are also the phases most easily viewed and evaluated by the project's stakeholders, and consequently where the project manager is asked the most difficult questions.

This topic is aimed at introducing you to the methods, tools and techniques which the project manager should use to execute and close projects.

LEARNING OUTCOMES

When you have worked through this topic, you should be able to

- explain what project schedule control entails and how it is aligned with the project control process
- explain how schedule performance is tracked throughout the life of a project, how changes are incorporated into the schedule and how the project schedule is updated
- distinguish between the various approaches to schedule control
- illustrate the use of planned resource utilisation, resource levelling and resource limited scheduling with practical examples
- explain the purpose of project cost planning and performance measurement
- compare actual costs with budgeted costs and illustrate how work performed is determined
- illustrate the use of earned value analysis and performance indices to monitor project progress
- illustrate how cost forecasting is used to predict the final cost of a project
- explain the importance of project cost control and cash flow management

Topic study units

Study unit 10: Reducing project duration

Study unit 11: Monitoring progress

Study unit 12: Project closure

Study unit 10

Reducing project duration

KEY CONCEPTS

- crashing
- crash point
- crash time
- direct costs
- fast tracking
- indirect costs
- outsourcing
- project cost – duration graph

OVERVIEW

From personal experience and events in their own lives, students will be familiar with the occasional need to fast track their own little projects, to bring something to an earlier conclusion or to just “finish this quickly” in order to move onto something else that is more interesting or more pressing. Consider the following examples:

- You are a defence contractor. A conflict has just erupted in “Northernonia”. Your client has rushed peacekeeping troops into the area and these have suffered some serious casualties. Public opinion at home is very intolerant of war casualties and your client needs your product to avert future casualties. He needs your product now – much earlier than you originally promised.
- Without consulting you, your boss has made a commitment to the shareholders to deliver your project’s output by a much earlier date than you originally planned. You now need to perform on her commitment. (See “Imposed Deadline” on page 307 of Larson and Gray.)

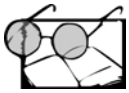
Also consider the following real-life situation:

In 2009 and 2010 the Toyota Motor Corporation built a series of motor vehicles which experienced problems with their accelerator pedal mechanisms, leading to some serious accidents. Quite obviously, the problem had to be corrected. However, since the problem posed a serious safety risk to motorists and the public at large, it is fair to assume that Toyota made an enormous effort to reduce the duration of some aspects of their product development projects to avoid such problems in future (eg reduce the product design time and allow more time for comprehensive product testing). It is also fair to assume that Toyota implemented an “emergency” project to address this problem – a “must do” project as discussed on page 36 in Larson and Gray.

Keep in mind one important factor when working through this study unit: **Any effort to reduce the overall project duration must always be directed at activities that**

lie on the critical path. Reducing the duration of activities that are not on the critical path will not bring about any reduction in project duration.

10.1 THE RATIONALE FOR REDUCING PROJECT DURATION



Study pages 305 to 312 in Larson and Gray.

Students must ensure that they understand clearly the various options the project manager has to reduce project duration, both when resources are constrained and when they are not. Note that crashing and fast tracking are both techniques for reducing duration, but they are not the same technique. The PMBOK® (2008) defines them as follows:

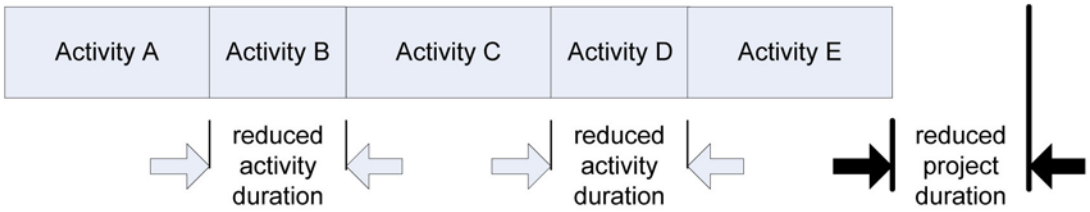
- **Crashing**. A specific type of project schedule compression technique performed by taking action to decrease the total project schedule duration after analysing a number of alternatives to determine how to get the maximum schedule duration compression for the least additional cost. Typical approaches for crashing a schedule include reducing schedule activity durations and increasing the assignment of resources on schedule activities.
- **Fast tracking**. A specific project schedule compression technique that changes network logic to overlap phases that would normally be done in sequence, such as the design phase and the construction phase, or to perform schedule activities in parallel.

The differences between these techniques are illustrated in figure 10.1 below.

- All activities A to E are assumed to be on the critical path
- This diagram is for illustrative purposes only. Do not assume from this example that fast tracking techniques are necessarily more effective than crashing techniques in reducing project duration.

A: Basic project activities before attempts to reduce duration

B: Reducing project duration by CRASHING



Note: activities B and D have been crashed. In practice, we can strive to crash any or all activities.

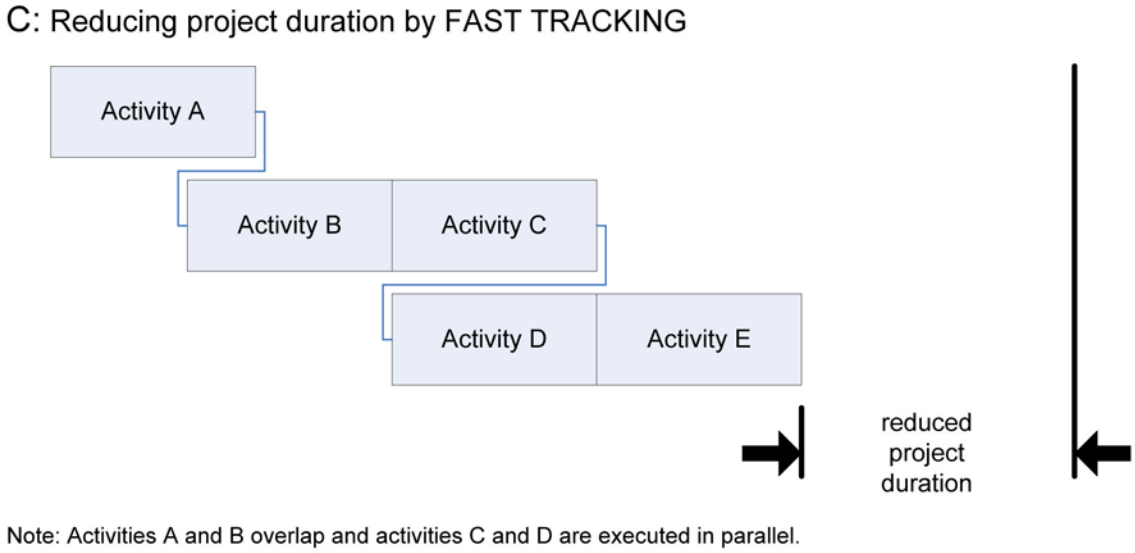
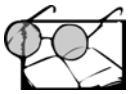


Figure 10.1

Crashing and fast tracking activities compared

A project manager is not restricted to using either one or the other of these techniques on a project. Any combination of the two may be used, provided it does not disturb the logical flow of work.

10.2 THE PROJECT COST-DURATION GRAPH



Study pages 313 to 323 of Larson and Gray.

You should realise by now that reducing project duration by crashing will incur additional costs. The project manager must be aware of the cost implications to the project and the extent of potential cost/duration trade-offs. Ensure that you understand the rationale for the project cost-duration graph and the three major steps required to construct such a graph. Keep in mind that by using the project cost-duration graph, project managers always seek the cheapest method of reducing project duration.

We acknowledge that the concepts introduced in this section may be somewhat difficult to grasp the first time. Reread this section until you fully understand it, particularly the simplified example and figures 9.3 to 9.6 on pages 316 to 318 of Larson and Gray.

Checklist

After completing this study unit, you should be able to

- explain the rationale for reducing project duration
- illustrate the importance of reducing project duration by means of the project-cost duration graph (see figure 9.1 of Larson and Gray)
- explain some of the practical considerations of project duration reduction efforts

EXERCISE

Complete the following exercise to verify your understanding of the subject matter.

This exercise is suggested for your own study purposes only and is NOT REQUIRED for submission to Unisa.

Load the student resource CD-ROM for the fifth edition of *Project management: The managerial process* by Larson and Gray. Select "Online Learning Centre" and then "5e. Online Learning Centre website". Select "Student Edition" and then "Chapter 9" from the dropdown menu. Choose "Multiple Choice Quiz" and complete all 15 questions.

E-mail the results (answers) to yourself and evaluate these critically to help you understand this study unit. Repeat the test as often as you wish. Note that the answers are provided by McGraw Hill and have not been verified by your lecturers at Unisa.

Reflection

If you were given a choice, would you fast track or crash your project rather than risk a delay?

SUMMARY

Delaying projects is inherently risky and there is sometimes ample reason for a project manager to consider reducing the duration of the project he or she is managing. In this study unit, we considered these reasons and some ways the project manager might accelerate the completion of a project. Finally, we reviewed some practical considerations he or she has to keep in mind when reducing duration.

Study unit 11

Monitoring progress

KEY CONCEPTS

- baseline budget
- budget at completion (BAC)
- control chart
- cost performance index (CPI)
- cost variance (CV)
- earned value (EV)
- estimated cost at completion – forecasted (EACf)
- estimated cost at completion – revised estimate (EACre)
- per cent complete index – budget costs (PCIB)
- per cent complete index – actual costs (PCIC)
- schedule performance index (SPI)
- schedule variance (SV)
- scope creep
- to complete performance index (TCPI)
- tracking the Gantt chart
- variance at completion (VAC)

OVERVIEW

In previous study units we indicated that the project manager fulfils both a leadership and a management role, and that the balance of this dual responsibility will shift depending on the specific needs of the project and the phase of the project life cycle in which the project is. Generally speaking, the early phases lean towards leadership and the later ones towards management. Since topic 4 of this study guide is about project execution, we now lean more towards management and specifically the project management tools and techniques which are used to measure and evaluate project progress and performance.

It is a basic human trait to avoid, if possible, any form of performance measurement. This is unfortunately reflected in project management, where performance measurement, evaluation and reporting are not conducted nearly as well as it could and should be. As an example, think of the reporting performance of our political leader's (inaccurate, incomplete, misrepresentation of the facts, padding, etc). However, in the dynamic commercial environment where good performance means economic survival, the evaluation and reporting of performance are much more central to good management.

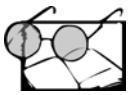
One of the basic criteria required for project success is that it meets all the TCP criteria agreed on with the project stakeholders. The time (T) and cost (C) measures that are used are quantitative (therefore performance is evaluated, calculated and expressed in numbers), whereas performance (P) may be measured both qualitatively

(by assessing the qualities) and quantitatively (eg technical performance). In this study unit we focus mainly on time and cost performance using quantitative methods. Some basic arithmetic skills will be required of you to do this.

The process of measuring, evaluating and reporting on project performance helps project managers in three ways:

(1) It keeps the project stakeholders, especially the project team, focused on the main issues of the project.
(2) It helps the team to identify potential problems before it is too late or the problems become too large to take corrective action.
(3) It holds people accountable for the project's performance in their specific areas of responsibility.

11.1 THE STRUCTURE OF A PROJECT MONITORING INFORMATION SYSTEM



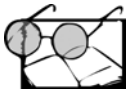
Study pages 453 and 454 of Larson and Gray.

Common sense tells us that small projects can easily be monitored and controlled as a mental exercise, perhaps using "the back of a cigarette box" since the number of activities and resources are small and performance is easily noted just by observation. Obviously, this approach would be impossible on large projects with hundreds or even thousands of scheduled activities employing multiple, diverse resources. In the latter case, the project organisation would be required to have a PMIS which allows the project manager to collect and process the vast amounts of data generated, thereby assisting him or her in managing and controlling the project. Nicholas and Steyn (2012:443) define the PMIS as a "system for collecting, organising, storing, processing and disseminating information". A high-level PMIS system may be a separate function or module of a complex ERP system such as SAP. Note that although a desktop package such as MS Project may have some of the basic PMIS functionality, it is not a PMIS system. A PMIS system allows for automated data collection, while MS Project requires data to be inserted manually – thus making it unsuitable for managing large and complex projects.

You will recall from the discussion "Putting project management into perspective" that any large project cannot be run independently of an organisation's internal management systems, for example the ERP system. Also remember that setting up the ERP/PMIS function for a new project can be a complex task and forms part of a new project's planning activities (topic 3).

A more detailed examination of PMIS systems forms part of the honours level course in project management.

11.2 THE PROJECT CONTROL PROCESS



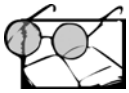
Study pages 454 and 455 of Larson and Gray.

Ensure that you understand the four steps of the project control process, especially setting the baseline plan. Note that setting a solid baseline will assist greatly in managing two of the biggest headaches in project management:

(1) change control (see Larson and Gray, page 230).
(2) scope creep (see Larson and Gray, pages 105 and 475).

A solid baseline gives the project manager an anchor, a predefined basis or foundation from which to manage these aspects.

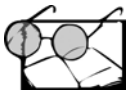
11.3 MONITORING TIME PERFORMANCE



Study pages 455 to 458 of Larson and Gray.

This section highlights measuring time performance with two different tools (charts) for measurement. Note that the Gantt chart tool is approximately a hundred years old and is still the preferred way of reflecting the time progress of a project (Larson and Gray, page 462). Ensure that you are able to read a Gantt chart and that you can interpret it properly with respect to critical path, baseline duration, available slack and work completed.

11.4 DEVELOPMENT OF AN EARNED VALUE COST/SCHEDULE SYSTEM



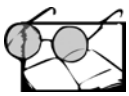
Study pages 458 to 472 of Larson and Gray.

The concept of earned value is at the very heart of project progress management, giving management an essential tool to quickly establish whether the project is on track and – if not – a quantitative measure of the extent of the deviation. The PMBOK® (2008:433) defines earned value management (EVM) as follows:

> … a management methodology for integrating scope, schedule and resources, and for objectively measuring project performance and progress. Performance is measured by determining the budgeted cost of work performed (i.e. the Earned Value) and comparing it to the actual cost of work performed (Actual Cost).

Ensure that you understand the terms used (table 13.1 on page 459 of Larson and Gray) and that you can calculate SPI, CPI and the percentage complete indices. Also make sure that you really understand the concept of earned value – it is not as easy as it would first seem.

11.5 FORECASTING THE FINAL PROJECT COST

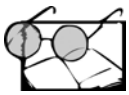


Study pages 472 to 475 of Larson and Gray.

From the previous section, you will have noted that the present value (PV) is always calculated to the project planned end date (see again figure 13.5 on page 463 of Larson and Gray). However, if a project's AC and/or EV deviates negatively from plan (as reflected in the SPI and CPI calculations), especially in the later stages of the project life cycle, it may be reasonable to expect a schedule and/or cost overrun, making it necessary to calculate a new completion cost (EAC).

The new final project cost forecast (EAC) becomes important because it allows the project manager to make an assessment of his or her project's overall financial performance at closure, which is important to the organisation's top management and especially the shareholders. The cost variance at completion (VAC) is essential to establish the financial success of the project. Management and shareholders always wish to know as early as possible the expected financial outcome of a project. Recall what we said about accurate and honest reporting in the section "Project management in perspective".

11.6 OTHER CONTROL ISSUES



Study pages 475 to 479 of Larson and Gray.

In previous study units of this course we often alluded to the problems in projects originating from scope creep and baseline changes. Study this section for a deeper discussion of these problems. This should be easy for you at this point, since we often referred to this text in previous study units.

Checklist

After completing this study unit, you should be able to

- discuss project control and how a PMIS can help in the process
- compare the project management tools used for monitoring time performance
- explain the use of earned value as a management methodology with the help of diagrams and figures
- estimate project cost at completion
- discuss other project control issues and their effect on project success

EXERCISE

Complete the following exercise to verify your understanding of the subject matter.

This exercise is suggested for your own study purposes only and is NOT REQUIRED for submission to Unisa.

Load the student resource CD-ROM for the fifth edition of *Project management: The managerial process* by Larson and Gray. Select "Online Learning Centre" and then "5e. Online Learning Centre website". Select "Student Edition" and then "Chapter 13" from the dropdown menu. Choose "Multiple Choice Quiz" and complete all 15 questions.

E-mail the results (answers) to yourself and evaluate these critically to help you understand this study unit. Repeat the test as often as you wish. Note that the answers are provided by McGraw Hill and have not been verified by your lecturers at Unisa.

Reflection

The threat of scope creep is ever present in project management and we cannot overemphasise the importance of managing it effectively. However, the phenomenon of scope creep is not restricted to formal project management only. Can you think of small projects and tasks which you undertake in your daily life which just seem to grow and grow in size? For example, you contract with yourself to mow the lawn for an hour early on a Saturday morning but then, since you are dirty in any case, you trim the edges, pull out some weeds and … before you know it, the whole day is gone. Mowing the lawn for an hour was the original scope of work; the rest was scope creep.

Many project managers can joke with their project teams that the biggest risk on many projects is an engineer with a sharp pencil. An engineer's innate desire to keep improving things again and again in incremental steps in the design phase not only unnecessarily delays the project schedule but can also be a form of scope creep which makes it near impossible to fix a product baseline from which to proceed with manufacturing.

SUMMARY

A well-known dictum states that "we act as we are measured". Applying this thinking to project management, we can say that after we "planned our work", we should "work our plan" by measuring ourselves with the techniques discussed in this study unit. Simply put, this means setting a baseline, measuring ourselves against that baseline, noting deviations and taking corrective actions where necessary to bring the project back in line.

Study unit 12

Project closure

KEY CONCEPTS

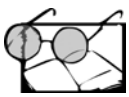
- lessons learned
- performance review
- project closure
- project evaluation
- project facilitator
- retrospective
- team evaluation
- 360-degree review

OVERVIEW

In the previous study units of topic 4 we discussed the execution phase of the project life cycle (see again figure 1.1 on page 7 of Larson and Gray). We now conclude topic 4 by addressing the last phase (the closing phase). You will recall from our earlier discussion, “Putting project management into perspective”, that project closure can be particularly challenging for a project manager because interest in the project will have dipped to an all-time low and money and other resources to get the work done will be increasingly difficult to get. Project managers are “action men” who “get things done”. Many project managers will be frustrated by the many administrative tasks that must now be completed. Do not underestimate the importance of this phase; take full cognisance of Larson and Gray’s warning (2011:505): “Observation tells us that organisations that manage their project closure and their project reviews well, will prosper. Those that don’t tend to have projects that drag on forever and they repeat the same mistakes over and over”.

Note that in other, more advanced, textbooks on project management three separate concepts (decommissioning, termination and disposal) are discussed which may be confusing. These are three very different concepts which are often lumped together and used interchangeably by people who are unfamiliar with project management. For the purposes of this course, project closure must be understood to mean project termination.

12.1 PROJECT CLOSURE

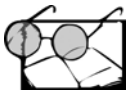


Study pages 505 to 507 of Larson and Gray.

Take special note of the three main actions shown in figure 14.1 on page 505 of Larson and Gray. The figure details in broad overview the contents of the rest of this study unit.

Not all projects end as originally planned, for a variety of reasons. Study the five reasons given, taking special note of premature and perpetual closure. The case of perpetual closure can be particularly trying for a project manager and may be (and often is) the direct result of two problems we mentioned in study unit 11: scope creep and baseline changes. Study again pages 475 to 478 of Larson and Gray.

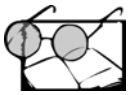
12.2 WRAP UP CLOSURE ACTIVITIES



Study pages 507 to 511 of Larson and Gray.

Study this section, noting the six major activities which must be completed. Getting delivery acceptance from the customer is the most crucial. As an example, consider a case where you do not have delivery acceptance but have already reassigned project team members. In a worst-case scenario, the project manager may be forced to restart the project, reassemble the project team and only then complete the project for customer acceptance.

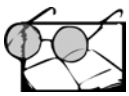
12.3 POST-IMPLEMENTATION EVALUATION AND RETROSPECTIVES



Study pages 511 to 524 of Larson and Gray.

Assuming that a project has not failed or been cancelled (as a result of a changed priority), an organisation will be forced to undertake many of the six wrap-up activities discussed in the previous section – if only to complete the project and to get disgruntled creditors off their backs. Unfortunately, the post-implementation (performance evaluation) and retrospective activities will be neglected or even forgotten about. The result is that nothing from the previous project is documented, nothing is learned (organisational learning), and the same mistakes will be repeated over and over again on subsequent projects the organisation undertakes. This may seem stupid and senseless to you as a student, but it is a problem (a fact!!) that is very well established in practice.

12.4 PROJECT SUCCESS (AND FAILURE)



Study the material that follows.

At some point during the closing phase, a project manager and his or her organisation will need to make an assessment of the project's overall performance and judge it as a success or a failure. Much like the "curate's egg" (used to describe something

that is partially bad but with some redeeming features), no project is ever completely successful or completely unsuccessful – it always leaves some areas for future improvements.

The PMBOK® (2008:9) states that a project's success is measured by product and project quality, timeliness, budget compliance and the degree of customer satisfaction. Broken down a little further, we could gauge project success by measuring

- customer satisfaction (Defining customer satisfaction is a major subject in itself, but we restrict ourselves to accepting the basic concept for now.)
- compliance with the project TCP criteria (Pinto [2010:35]) refers to these as the triple constraint
- quality and safety
- the successful and controlled inclusion of scope changes (scope creep and baseline changes)

Kemp (2006:49), taking a quality management perspective, reminds us that successful projects must meet the customer's specifications, stakeholder specifications and standards (the P in TCP). Often forgotten is the challenge of defining the external interfaces (ie the points where systems and subsystems come into contact). Consider for example a wonderful new product that was developed to work on 110 volts being introduced into a market which works only on 220 volts.

Burke (2011:27) argues that assessment (as presented above) is made from the project manager's perspective and that we should also look at project success from the viewpoint of a project sponsor by asking whether the project

- addressed a need
- solved a problem
- maintained competitive advantage
- exploited an opportunity
- increased profits
- increased sales figures
- enhanced our brand image

Making a decision as to whether or not a project has been successful is not as simple as it may seem from the argument above. Consider by way of example some of the following:

- A strong characteristic of project management is balancing the competing project constraints of scope, quality, schedule, budget, resources and risk. The relationship between these is such that a change in one will have an effect on at least one other. For example, a reduction in the budget available for a project will force a change in project scope or a reduction in quality, or perhaps even both. If the trade-offs have not been mutually agreed upon between the contractor and the client, project success may be questionable. (**Stop at this point and reflect on what has been said in this paragraph, comparing this with figure 4.2 on page 107 of Larson and Gray**).
- Project management demands that all project stakeholders be considered, not only the customer. The customer of the Gauteng Toll Road System may be well satisfied with the project but other stakeholders (the ordinary motorists, commercial truckers

and supply chain operators) presently have a very different view of the project's success.

- Perceptions strongly influence the success/failure decision. A software developer who develops a new system and meets all the requirements for project success may declare it a success. However, if this system is not used by the users because it is overly complex, they may view it as a failure. Has any user ever been really satisfied with a new ERP installation?
- The project success criteria and the ranking of these are not equal across organisations or industries, neither is it always automatically a financial consideration. In aerospace the primary measure is engineering performance (eg fuel consumption per passenger seat mile), while in a Disney theme park it is visitor safety (eg incident-free visitor days).
- It is our assertion that any project which is not completed within the boundaries of ethical conduct is not a success. Any project, even if it does meet the success criteria stated above, cannot be declared truly successful if it remains tainted with signs of ethical misconduct, corruption, nepotism and/or negative media exposure.
- Finally, we should always ask ourselves at what cost to the environment a project has been completed. Can any project which polluted the rivers and atmosphere, destroyed the rain forests, or taken the indigenous flora and fauna to the brink of extinction be considered a success? Measured by this last consideration, the booming economy of China may not be the success it is touted to be.

Checklist

After completing this study unit, you should be able to

- explain what closing a project entails and describe the three main activities required
- explain how projects may be closed (closure types)
- explain the purpose of team and individual evaluations
- illustrate the purpose of retrospectives
- argue whether a project is a success or a failure

EXERCISE

Complete the following exercise to verify your understanding of the subject matter.

This exercise is suggested for your own study purposes only and is NOT REQUIRED for submission to Unisa.

Load the student resource CD-ROM for the fifth edition of *Project management: The managerial process* by Larson and Gray. Select "Online Learning Centre" and then "5e. Online Learning Centre website". Select "Student Edition" and then "Chapter 14" from the dropdown menu. Choose "Multiple Choice Quiz" and complete all 15 questions.

E-mail the results (answers) to yourself and evaluate these critically to help you understand this study unit. Repeat the test as often as you wish. Note that the answers are provided by McGraw Hill and have not been verified by your lecturers at Unisa.

Reflection

One school of thought in project management maintains that all projects require a minimum of two project managers: one to define and plan them, and another to execute and close them. They argue that the project manager's skills and the personality required at the start and end are very different and that these traits are not found in one individual only. What do you think?

SUMMARY

In this study unit we reviewed project closure as the final phase of the project life cycle, we introduced three major activities which must be undertaken and we discussed the deliverables which result from these activities. We stressed that project closure is a difficult phase to execute, given that the project team's interest is low and many project organisations' management commitment to these tasks is sadly lacking. Finally, we considered the question of project success, introducing some considerations which make judging project success more complex.

TOPIC 5

Managing and leading projects

Aim

A basic principle of management is getting things done by harnessing the help of other people. Nowhere is this more important than in project management, since no project has a permanent staff complement; instead staff are allocated to the project as and when required. The aim with this topic is to establish what is required of a good project manager in terms of leadership and management skills. What makes an effective project manager? What does it take to build an effective project team? What is the role of good ethical conduct in all of this?

LEARNING OUTCOMES

When you have worked through this topic, you should be able to

- distinguish between the different responsibilities and requisite skills of a project manager
- explain how project management skills may be developed, and why delegation and managing change are so important for a project manager
- explain the importance of project team development in achieving project effectiveness
- argue why ethical behaviour in a project environment is crucial for project business relationships
- show why conflicts on projects are inevitable and how they may be resolved
- indicate why good time management is of particular importance for high performing project teams
- explain the role of project communication and documentation; and the importance of improving personal communications, effective listening skills, conducting effective meetings, delivering formal presentations and writing good reports

Topic study units

Study unit 13: Leadership

Study unit 14: Managing project teams

Study unit 13

Leadership

KEY CONCEPTS

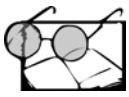
- emotional intelligence (EQ)
- inspiration-related currencies
- the law of reciprocity
- leading by example
- management by wandering around (MWBA)
- personal-related currencies
- position-related currencies
- proactive
- relationship-related currencies
- social network building
- stakeholder
- systems thinking
- task-related currencies

OVERVIEW

In previous study units we stated that project management can be subdivided into two broad groupings: (1) a hard element of project management processes and techniques and (2) a softer element encompassing the human elements and interfaces. Up to this point, our focus has been on the hard element. Now we shift our attention to the softer, human element. However, let us be clear on one important aspect: The human aspect might be the softer one, but it is not less important.

Projects are always executed by human beings, supported by technology and techniques only in order to make things easier or better understood. Anybody who has ever had to manage projects of any kind or description – from the simplest to the most complex – will attest to the difficulty of motivating, co-ordinating and managing the human element (the human resources) of a project. Failure to do so successfully will almost certainly sink the project.

13.1 PROJECT LEADERSHIP IS FUNDAMENTAL TO PROJECT MANAGEMENT



Study the material that follows (adapted from Steenkamp: CBPM01L, module 1).

13.1.1 Personal power

In this section we introduce you to leadership as a fundamental prerequisite for effective project management. When one reviews the traits of effective project managers, one gets the impression that effective project managers must have superhuman powers. They need more than one management style (have to wear “different hats”) and they have to be adaptive when they encounter a messy project filled with inconsistencies and paradoxes.

Good leaders have a personal power which motivates others to follow spontaneously. They lead by example and “walk their talk” (figure 10.4 on page 354 of Larson and Gray). Good leaders are dynamic, they have personal power and they practice self-management. They know that they cannot successfully lead others without having their own house in order. They transform their followers, empower them and uplift them. They release the untapped human potential in others and cherish their human capital. They adapt their leadership style to the needs of each individual whom they lead (situational leadership).

13.1.2 Visionary leadership

The CEO and executive management provide a vision of where the organisation wants to be as part of their strategic management effort. This vision is a picture of the desired future state of the organisation, whereas the mission encapsulates the factors which will help them reach this state. The visionary leader (and/or project manager) communicates this same vision to others and ensures that all stakeholders understand it and buy into it.

Another important function of leadership is to ensure that the employees (ie the project team) are empowered by making them co-responsible for the success of “their” project. To achieve this, good leadership requires

- constant and effective communication
- creating an attitude in employees which motivates them to serve their customers (both internal and external) to the best of their abilities
- identifying and developing the skills of employees, thereby increasing their contributions
- helping them understand the basics of good management

All the factors that we discuss in this section will help project leaders to establish an ideal project organisation culture.

13.1.3 Good leadership is transformational

Good leadership can only be measured by the impact a leader has on his or her followers. Domination, subjugation or manipulation is not good leadership. Good leadership is transformational in that it brings about positive change. Transformational leaders pay individual attention to their followers and specifically draw out those who seem to be neglected.

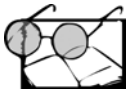
Effective leadership builds confidence in followers. Project leaders do not set out to be leaders, but become the accepted leaders through the quality of their actions and

the integrity of their intent. Leaders are much like eagles – they do not flock. They are found one at a time. They inspire project members to be co-builders of something which endures and is worthy of effort.

Effective leaders have some personal power and do not rely on delegated authority. In summary, we are able to see the following distinctive traits in good project leaders:

- An ability to apply situational leadership (ie wear different hats for different situations).
- An ability to "drive" projects without compromising their own or their team's personal needs. For example, the stresses and urgency of project needs can quickly compromise ethics, health and safety, and environmental requirements.
- They lead without the use of manipulation.
- They display experience, wisdom and maturity, and they understand the need for balance and leading by example.
- They have various sources of power that motivate their followers to co-operate and thereby ensure synergy.
- They have the energy to lead change and positively transform project resources into the specified project outcomes.
- They empower their team members to uplift themselves and perform at a higher level than they originally thought possible.

13.2 SELF-MANAGEMENT PRINCIPLES FOR PROJECT LEADERS



Study the material that follows (adapted from Steenkamp: CBPM01L, module 1).

You cannot manage others if you cannot manage yourself. A healthy self-esteem is vital for quality since quality starts at the source. This implies that quality should start with an individual's search for his or her inner self, which will reveal both things positive and human limitations. Self-examination therefore cannot be ignored in the search for true business excellence.

13.2.1 The self-management concept

The self must also be managed. Your personal effectiveness is the result of taking responsibility for your own feelings, thoughts and actions, thereby determining your attitude towards life in general and your physical health. The way we act in life, and how we apply our minds and emotions, plays a pivotal role. Self-management must commence with you: you have to get your own house in order before you can even attempt to manage others.

13.2.2 Managing the emotional body

Your emotional body is the source of all your feelings and moods and it interacts continuously with your mental body. An emotional focus on life can be wonderful in its positive aspects, making us extremely sensitive to beauty, the arts, nature, music and dance. The emotional body's focus on the negative aspects can be an emotional roller

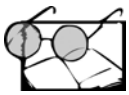
coaster characterised by instability. In the same way as an IQ has been developed to measure mental capacity, an attempt has been made in recent years to devise an emotional quotient (EQ) to measure emotional capacity or maturity. It is now generally recognised that a person's EQ is a better predictor of success in life than his or her IQ. (See page 361 of Larson and Gray for further details on the EQ).

Emotionally intelligent people are aware of their body's responses to events and people. They are better able to identify various physiological responses with appropriate emotional labels. They are skilful in choosing, through the mental body, effective ways of acting and are not controlled by their emotions. They can accept and value both their positive and negative feelings, and take full responsibility for them. They display an internal locus of control and do not blame others (the externals) for feeling the way they do. Many good things in an organisation or on a project can be quickly destroyed if emotions (moods and feelings) are not controlled.

13.2.3 Managing the mental body

Project managers are required to make good decisions and to do this, it is important to distinguish between the emotional body and the mental body. Dalton (1998:4) regards the mental body as a mental tool of the outer self: capable of reasoning, calculating, assessing and other cerebral functions. The mental body operates on two levels: (1) a conscious level which constitutes the reasoning mind and (2) a subconscious one which constitutes the non-reasoning mind. The conscious mind is predominant and serves as protector, programmer and master of the subconscious.

13.3 LEADERS DETERMINE THE ORGANISATIONAL CULTURE



Study the material that follows (adapted from Steenkamp: CBPM01L, module 1).

The project culture is partially determined by the leadership. Project managers do much to influence the culture and the personality of their projects, whether they do so intentionally or not. Project managers should therefore strive to influence the following elements of their organisation's (and their project's) culture:

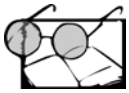
- **Behaviour** refers to the way people interact with one another and what is tolerated in the organisation. Consider the following questions. What are the unspoken rules of communication? Does the organisation have an open door policy or must appointments be made to see superiors? What is the generally accepted form of address, first names or titles?
- **Norms** are the standards used to structure the functioning of working groups; they indicate how things are done. For example, are projects always started on time? Breaking with the norms is frowned upon. Note that norms are not always positive, for example a weak client focus attitude with a poor service delivery result cannot be judged as a good norm.
- **Dominant values** are generally seen as the core of a culture. Values are what

people regard as right and wrong. Leadership given to unethical behaviour cannot expect otherwise from their subordinates.

- The **rules of the game** are the accepted ways for getting ahead in the organisation. How do people get promoted and rewarded in the organisation? Is it fair, based on experience, qualifications and demonstrated performance? Does the organisation "grow its own timber" or recruit from outside? Are there openly available succession plans which determine how people will advance in the company?
- The **cultural climate** is the prevailing level of satisfaction that employees have with the organisational culture. Note that the cultural climate can change quickly over a very short period of time, while the organisational culture itself is much more enduring and highly resistant to change and external influences.

Note also that since the project manager sets the "tone" for his or her own project, it is possible that a particular project will develop its own subculture distinct from that of the parent organisation. This is especially possible where the project is being executed in a projectised organisation and/or where the project team is located remotely from the parent organisation.

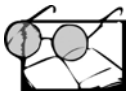
13.4 THE EFFECTIVE PROJECT MANAGER



Study pages 339 to 347 of Larson and Gray.

Students should clearly understand the differences between leadership and management, and when each of these traits is more desirable on the project. Projects with a higher degree of uncertainty in terms of scope, risk, technology or communication breakdown require more leadership. Similarly, good leadership is required more in the early phases of the project life cycle, while good management is more predominant in the executing and closing phases when project conditions are more stable. Based on this, some may argue that a project should not have one project manager throughout its full life cycle but rather at least two: a good leader to initiate the project and a good manager to finish it.

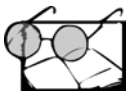
13.5 SOCIAL NETWORK BUILDING, ETHICS, TRUST AND OTHER QUALITIES



Study pages 347 to 362 of Larson and Gray.

Effective project management requires a lot more than just a comprehensive knowledge of tools and techniques. Aspirant project managers are perhaps inclined to try to manage from their offices, relying predominantly on the harder aspects of project management and consequently neglecting to take and exercise leadership, especially when they are young, inexperienced and do not have much stature in both their organisation and their working environment. These sections of Larson and Gray discuss some of the more important leadership qualities, requirements and traits.

13.6 ETHICS AND PROJECT MANAGEMENT



Study the material that follows.

Much has been suggested and alluded to in previous study units about ethical behaviour in projects and by project management. The project's working environment is characterised by numerous challenges, conflicts, supplier negotiations, government regulations and a host of other considerations – all of which will offer ethical dilemmas which the project manager will face throughout his or her working career. Arriving at a decision as to what is ethical can be challenging, and the "right" answer may differ depending on your organisation and its culture.

The core of the ethical challenge facing business (and project managers) may be summarised in the following two questions:

(1) How can we get acceptable bottom-line results, remain competitive and also be committed to ethical practices, all at the same time?
(2) Is it possible to stay competitive in business and still operate in an honest and ethical manner?

These questions are sure to place the project manager in a stressful situation, sometimes pushing him or her to actions which he or she knows are questionable and morally wrong. Despite the temptations, the ethical project manager should

- Not avoid confronting the ethical issues (avoidance signals the tacit acceptance of unethical practices – saying "it's okay"). He or she should decide what is right and then do what is right
- Be clear headed and decisive in order to act in a manner that is consistent with his or her and the organisation's values

All that is necessary for evil to triumph is that good men do nothing."

*– **Edmund Burke** (**Irish** orator, philosopher and politician)*

Blanchard and Peale (1988) suggest that when the project manager is confronted with an ethical dilemma, he or she should subject the decision-making process to an ethics test (see table 13.1 below) and ask the following questions:

Table 13.1

Basic questions of an ethics test

(1) Is it legal?	• This question should be reviewed not only from a civil and criminal law perspective, but also for compliance with company policy. • **This is a test against existing standards.**

(2) Is it balanced?	• Is the decision fair or does it heavily favour one party over another? Is it fair in both the short term and the long term? Is it a win-win decision for both parties? • **This decision activates the project manager's sense of fairness and rationality.**
(3) How will it make me feel about myself?	• This implies looking at yourself in the mirror. • **The focus is on the manager's emotions and standards of morality.**

Blanchard and Peale (1988) offer five core principles for ethical decision making, arguing that these are also the ingredients for genuine, lasting fulfilment in life. Highly successful, satisfied individuals practice these five P's with great consistency.

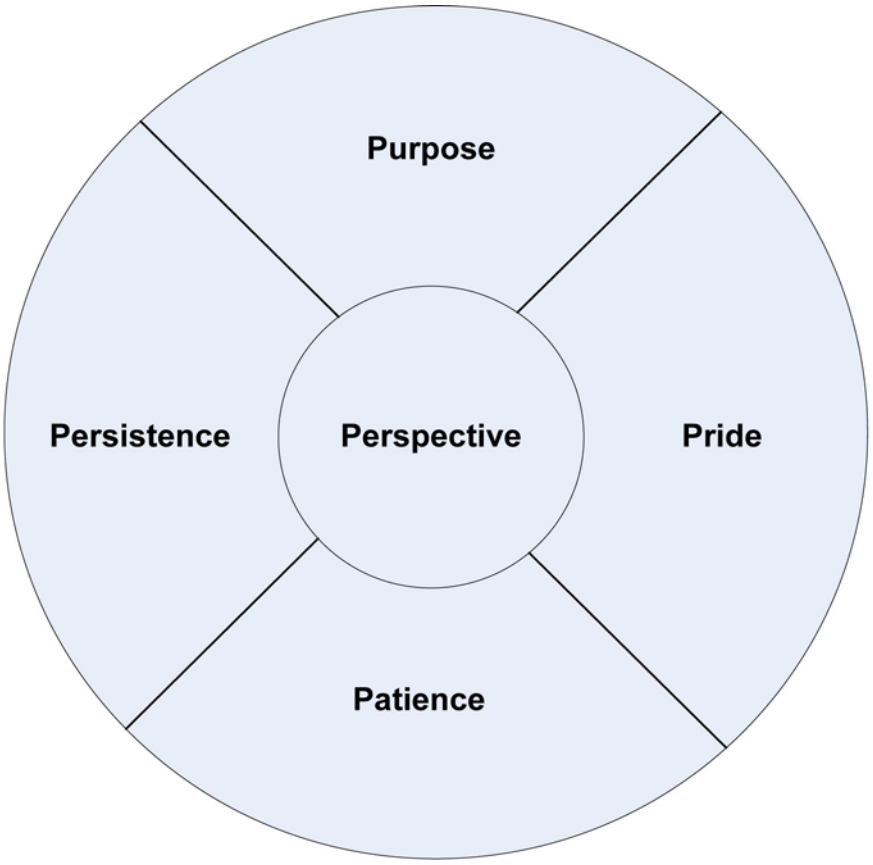


Figure 13.1

The interrelationship between the five Ps

While the five Ps can be applied in both a personal and organisational ambit, only the personal ambit is considered here. Ethical behaviour is related to an individual's sense of self-esteem. A healthy self-esteem may be developed through:

- **Purpose.** Have your own personal mission statement. Decide what kind of business you are in as a person. Picture yourself as an ethical person, somebody who is happy to take a look at yourself critically in a "mirror test" at any time.
- **Pride.** Develop a sense of satisfaction from your accomplishments. Believe in

yourself and your abilities. Confidence in yourself gives you the strength to make good ethical decisions despite external pressure to act otherwise.

- **Patience.** Have confidence in your decisions and take the time to wait out the results. Do not second guess yourself and undo good decisions. Take the long-term view of the consequences of your actions. Ethically based decisions do pay off in the long run.
- **Persistence.** Keep to your commitments and make your actions consistent with your guiding principles. Consistently act in a way that lives up to your mental image. Behave ethically at all times, not only when it is convenient. Show the trait of ethical toughness.
- **Perspective.** Take time away from the daily rush to awaken your inner self. Develop the capability to see what is really important in any given situation.

Checklist

After completing this study unit, you should be able to

- describe the characteristics of effective leadership in project management
- indicate how project leaders can influence organisational culture
- explain why project managers must exercise situational leadership
- show an understanding of self-management in terms of a healthy self-esteem
- explain the management of project stakeholders and social networks
- describe some of the ethical dilemmas flowing from project management
- illustrate how project managers may take ethical decisions
- summarise the qualities of effective project managers

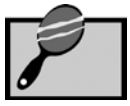
EXERCISE

Complete the following exercise to verify your understanding of the subject matter.

This exercise is suggested for your own study purposes only and is NOT REQUIRED for submission to Unisa.

Load the student resource CD-ROM for the fifth edition of *Project management: The managerial process* by Larson and Gray. Select “Online Learning Centre” and then “5e. Online Learning Centre website”. Select “Student Edition” and then “Chapter 10” from the dropdown menu. Choose “Multiple Choice Quiz” and complete all 15 questions.

E-mail the results (answers) to yourself and evaluate these critically to help you understand this study unit. Repeat the test as often as you wish. Note that the answers are provided by McGraw Hill and have not been verified by your lecturers at Unisa.



Reflection

All of us are faced with moral and ethical temptations every day of our lives. Working in a project management environment may amplify these. Do you think

you are up to the task to work and act morally and ethically each and every day, even when no one else is looking?

SUMMARY

In this study unit we explored the concept of leadership in a project management environment. Because the project management environment is so dynamic (subject to constant change, conflict, regulation and commercial interests, amongst other factors), it often invites questionable, unethical behaviour from its many participants. Good project management demands ethical conduct from the project manager; the discussion presented here suggests how this may be achieved.

Study unit 14

Managing project teams

KEY CONCEPTS

- brainstorming
- dysfunctional conflict
- functional conflict
- groupthink
- nominal group technique (NGT)
- positive synergy
- project kick-off meeting
- project vision
- team building
- team rituals
- virtual project team

OVERVIEW

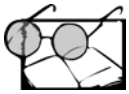
In this study unit we do not readdress the subject of leadership and teamwork as is covered elsewhere in other courses, for example in human resource management. We concentrate solely on those aspects of human relationships and organisational behaviour which are of particular importance and interest to project management. Earlier, we often referred to the execution of projects by people working in teams; this aspect is now examined in more detail here. The view of Steyn et al (2008) on teams is as follows:

- **Project team**. Two or more people work together to accomplish a common project goal. It can be said that teams produce virtually all project deliverables (both tangible and intangible).
- **Virtual team**. A group of people with a shared product goal achieve their objectives by having little or no face-to-face interaction.

Students should note that project teams are just like the projects themselves: they are temporary in nature. Teams are formed to execute projects and are then disbanded when the projects are completed. For teams who are working in pure project environments, the break-up and closure can be quiet traumatic; for teams who are working in functional or matrix-type structures, this may be less so since individual team members usually have their home departments and functions to go back to.

A popular and much abused dictum from business says “people are our most important resource”. In this study unit we explain why this is so from a project perspective (individuals working in project teams).

14.1 INTRODUCTION TO PROJECT TEAM DYNAMICS



Study the material that follows (adapted from Steenkamp: CBPM01L, module 1).

Project managers must embrace the importance of the concept “project teams”. The magic of project teams is captured in the term “synergy” (see Larson and Gray, pages 375 to 377). Although the concept of team (defined as a number of persons associated in some joint action) is familiar, especially in a sporting context, the deeper-level meaning and ethos are less well known. Note that the entire workforce of any large and complex organisation is almost never a team, although it is often professed to be so.

A social gathering, a meeting, a committee or a working group is not a team (see table 14.1 below). A team must have cohesion, purpose, energy and creativity, and – most importantly – should all be caught up in an atmosphere of synergy where the whole is bigger than the sum of the individual parts. This “magic” must be understood, harnessed, cherished and built into effective teams. Effective teams and good performance are inseparable, a desired state for all competent project managers.

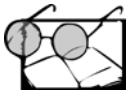
A team is a **powerful unit of collective performance committed to a common purpose**, performance objectives and approach. Usually, the team purpose has an element related to challenging aspirations, to winning, being excellent, to re-engineering, improving, revolutionising or being committed to developments on the cutting edge.

Think how often you yourself have been a member of a team which did not meet these criteria. Was it really a team or was it a team in name only?

Project management is a team game. Only rarely, if ever, are projects executed by teams of one. A project team must be an efficient and effective group. Steyn et al (2008) define this as follows:

- **An effective group**. One that achieves both high levels of task accomplishment and good human resource maintenance or relationships (ie they maintain a positive working relationship with one another).
- **An efficient group**. One that uses its energy and resources constructively to perform and achieve together. They are conscious of time, cost and quality in their application of roles and responsibilities.

14.2 PROJECT ORGANISATION BEHAVIOUR DIMENSIONS



Study the material that follows (adapted from Steenkamp: CBPM01L, module 1).

In this section we briefly discuss some of the organisational behaviour dimensions of the team role of the project manager. The main point to note here is that the project

manager does not operate in isolation from the project team, the project sponsor, internal and external customers, or any project stakeholders.

14.2.1 Project communication

The authors of some publications claim that more than 90% of a project manager's day is spent communicating or making sure that other project stakeholders communicate effectively. Whether or not this is true, the project manager is central to the project management system as the project communication hub. This role has many dimensions: co-ordinator, integrator, evangelist (to promote faith in the project), entrepreneur (to achieve results) and change agent (as a transformational leader).

Note: You should not conclude from this discussion that a project manager must be as glib as a used car salesman but rather that he should be a very good communicator.

14.2.2 Interpersonal skills

The most successful projects are those where trust, good communication and team work are allowed to flourish regardless of the formal planning and control. Project accountability cannot be delegated and it is often for this reason that project managers go the extra mile, climb in, get their hands dirty and often start to "live their projects". The benefit of this last point is debateable since the project manager starts to lose objectivity when this happens (review this discussion in Larson and Gray, page 405, for an explanation of this problem). Other areas where the need for good interpersonal skills is important include managing conflict, ensuring team cohesiveness, participative management, ethical conduct, role ambiguity and team relationships.

Project managers are constantly faced with the need to direct and influence decisions without directing or giving orders in a way other functional managers do. Project managers have considerably more responsibility than authority, which is why they need to seek other sources of power and influence (good interpersonal skills being one of them). Their role is dynamic, interactive and intellectually challenging.

14.2.3 The project manager's dilemma

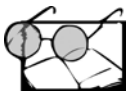
The responsibility/authority conflict problem for the project manager deserves a little more discussion. Being held directly responsible for project progress and performance without having the full and direct control of the factors directly influencing it is arguably the single biggest source of stress and burnout (and perhaps suicide) amongst project managers. Many very good managers have left the discipline for no other reason than this. Some students may be familiar with the TV program "The Apprentice", with Donald Trump, aired by the SABC some years ago. Although the program may not have been a full reflection of reality in project management, it did much to illustrate an important point: If a project is a success, the project manager is a hero; if not, he or she is in the … soup! (A more fitting word is omitted for purposes of social correctness.) Very often, the personal reputation and future working prospects of an active project manager rest heavily on the success of his or her last project: the project manager often stands or falls based on the results of his or her last project. By implication,

the project manager is only as good as his or her last project. This last point should reinforce the fact that project management is very much a results-driven activity.

14.3 PROJECT TEAM INTEGRATION

Project team integration is important for many reasons. One is that because project organisations usually have limited human resources with which to execute their projects, individuals with important or scarce skills are often tasked to work on multiple projects and end up serving on many project teams. As a result, a project manager may end up with a project team comprising full-time and part-time members. The challenge for the project manager is to integrate these people into an effective and efficient team, especially those part-time members who also have conflicting requirements from other projects. The Bible tells us that no man can serve two masters, but a part-time project team member may have multiple masters (projects and/or project managers) to try and please. Situations such as these lead to a lot of personal and interpersonal stress among team members, and the project manager has to exercise a lot of tact and diplomacy to integrate his or her team in such a situation.

14.4 SYNERGY DISTINGUISHES PROJECT TEAMS FROM GROUPS



Study pages 375 to 377 of Larson and Gray.

In this section we emphasise positive synergy and high-performance teams.

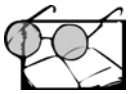
Table 14.1

The basic differences between teams and work groups

Working groups	Teams
• Individual work efforts or work products. • The group purpose is the same as the broader business/organisational mission. • Conduct efficient meetings. • Measure their effectiveness differently (meeting lead times, influence on others, decisions taken, etc). • Discuss, decide, socialise and delegate. • Individual accountability. • One strong, clearly focused leader.	• Collective work products. • A unique and specific team purpose that the team itself deliver. • Encourage creativity, open discussion and active interaction. • Problem-solving meetings. • Performance is directly linked to their collective work effort (work products). • Discuss, decide, socialise and impact one another (perform real work together). • Individual and mutual accountability. • Shared leadership roles.

(**Source:** Steenkamp CBPM01L)

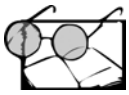
14.5 BUILDING HIGH-PERFORMANCE TEAMS



Study pages 377 to 400 of Larson and Gray.

This section is about the five-stage team development model, situational factors that affect team development and the activities of building high-performance project teams. Pay particular attention to the management of conflict within the project. Our natural inclination is to view conflict in a negative light because it indicates higher levels of stress and an unproductive working atmosphere. However, conflict can diffuse more serious conflict; act as a major stimulant of change; increase creativity and innovation; enhance communication; clarify goals and issues; increase performance, energy and group cohesion; and balance power and influence (Steyn et al 2008).

14.6 MANAGING VIRTUAL TEAMS

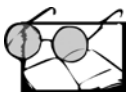


Study pages 400 to 404 of Larson and Gray.

The new world order, sometimes also called the global village, demands that more and more projects be executed by extended project teams who work over regional and even international borders. Although the practical examples are numerous, consider as an example the aircraft company Airbus which designs and builds its aircraft over many countries and even continents, bringing the parts and sub-assembly lines to one central plant only for final assembly and testing before final delivery to the client. For various reasons (including the exorbitant costs of accommodation and travel), project teams are forced to work in a virtual world, relying heavily on modern communication technology to assist them. Virtual teams therefore face some very unique problems which must be understood and overcome if the team is to work effectively. Consider by way of example the challenges of differing cultures, languages and time zones. (The challenges of international project management are addressed in Unisa's Honours BCom degree course in project management.)

Although Larson and Gray do not elaborate on this point, it is vitally important that all the members of a virtual project team are fully aware of the project scope and objectives (see again pages 102 to 105 of Larson and Gray) within their own sphere of responsibility and that they know exactly what performance is required of them.

14.7 PITFALLS



Study pages 404 to 406 of Larson and Gray.

While the advantages of effective high-performance teams are many, there are also some pitfalls which the project manager must be aware of and look out for. Once you have completed this section, it may be fun to compare these pitfalls with some of your own experiences while serving on teams (at school for example). Contrast what you have studied in this section with team spirit in a sports context, where some teams

actively strive to “fall in love with themselves”, often to their own detriment when they think they are infallible.

Checklist

After completing this study unit, you should be able to

- explain the concept of team dynamics and synergy
- distinguish between the different organisational behaviour dimensions which indicate the team role of a project manager
- explain why a project manager is viewed as the project communication hub
- distinguish between teams and groups
- discuss the two development models (the five-stage and punctuated equilibrium models)
- explain what is required for effective project meetings
- discuss conflict management in a project environment
- discuss the creation of high-performance teams and the pitfalls which may be encountered

EXERCISE

Complete the following exercise to verify your understanding of the subject matter.

This exercise is suggested for your own study purposes only and is NOT REQUIRED for submission to Unisa.

Load the student resource CD-ROM for the fifth edition of *Project management: The managerial process* by Larson and Gray. Select “Online Learning Centre” and then “5e. Online Learning Centre website”. Select “Student Edition” and then “Chapter 11” from the dropdown menu. Choose “Multiple Choice Quiz” and complete all 15 questions.

E-mail the results (answers) to yourself and evaluate these critically to help you understand this study unit. Repeat the test as often as you wish. Note that the answers are provided by McGraw Hill and have not been verified by your lecturers at Unisa.

Reflection

Your study of this topic should have made you very aware of the “team” nature of project management. Reflect on your own personality traits for a while. Are you a strong team player?

SUMMARY

In this study unit we stressed the requirement for working in project teams and not just groups. The project manager is at the very centre of his or her project team and it is the project manager’s responsibility to ensure that he or she forms a good

project team around himself or herself. In this study unit we reviewed some of the important elements of forming and managing project teams.

TOPIC 6

Contract management

Aim

Any project, irrespective of whether it is categorised as an internal or an external one, always requires a relationship between at least two separate parties. One party must have a requirement for a particular good and/or service (the client/s) and the other party must have the willingness and the capability to provide it (the contractor/s). It is only when the client and the contractor reach agreement and contract, either formally or informally, that a project is launched. We can conclude therefore that contracts, and managing these contracts, form an integral part of project management and the project manager's tasks. Although drafting contracts is a complex task best left to contract specialists and lawyers, at the end of the day it remains the duty of the project manager to execute the requirements of the contract as agreed to between the client and the contractor. This requires that the project manager has some insight into contracts and contract management at a practical, working level. In topic 6 we try to provide the necessary insight.

LEARNING OUTCOMES

When you have worked through this topic, you should be able to

- illustrate how a request for proposal (RfP) is prepared and a proposal solicited
- explain how proposed solutions are developed, and the importance of building sound relationships with customers and suppliers
- explain what the pre-RfP/proposal effort entails and how the bid/no-bid decision is made
- explain how a winning proposal can be developed
- distinguish between the proposal contents (including referring to the technical, management and cost sections) and explain the various pricing considerations
- explain what occurs during proposal submission, why follow-up is necessary and how the customer evaluates proposals
- distinguish between the various types of contracts and the various contract provisions

Topic study units

Study unit 15: Contract management

Study unit 15

Contract management

KEY CONCEPTS

- contract
- contract management
- cost-plus contracts
- fixed-price contracts
- proposal
- proposal evaluation and selection
- request for proposal (RFP)

OVERVIEW

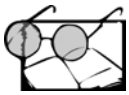
In this study unit we seek to give you an overview of contract management as it relates to the tasks of the project manager, since it is the project manager who must execute the work for which his or her organisation is contracted.

Before delving further into the subject, ensure that you understand these basic definitions applicable to contract management (taken from the PMBOK® [2008]) unless indicated otherwise:

Buyer	The acquirer of products, services or results for an organisation (sometimes also called the customer, employer, client, purchaser or acquirer).
Claim	A request, demand or assertion of rights by a seller against a buyer (or vice versa) for consideration, compensation or payment under the terms of a legally binding contract, such as for a disputed change.
Contract	A contract is a mutually binding agreement that obligates the seller to provide the specified product/service/result and obligates the buyer to pay for it.
Contract statement of work (CSOW)	Specifies the conditions under which the contract deliverables or end results will be accepted by the customer. It is similar to the SOW in the original RFP or the winning proposal, or it is a restatement of either to reflect the negotiated agreement (Nicholas & Steyn 2012:111).

Invitation for bid (IFB)	Generally, this term is equivalent to a request for proposal. However, in some application areas, it may have a narrower or more specific meaning.
Outsourcing	Contracting of the use of external sources (skills) to assist in implementing a project (Larson & Gray 2011:646).
Request for information (RFI)	A type of procurement document whereby the buyer requests a potential seller to provide various pieces of information related to a product, service or seller capability.
Request for proposal (RFP)	A type of procurement document used to request proposals from prospective sellers of products or services. In some application areas, it may have a narrower or more specific meaning.
Request for quotation (RFQ)	A type of procurement document used to request price quotations from prospective sellers of common or standard products or services. It is sometimes used in place of a request for proposal and in some application areas, it may have a narrower or more specific meaning.
Seller	A provider or supplier of products, services or results to an organisation (sometimes also called the contractor, supplier, vendor, producer or subcontractor).

15.1 CONTRACT MANAGEMENT IN PERSPECTIVE



Study the material which follows.

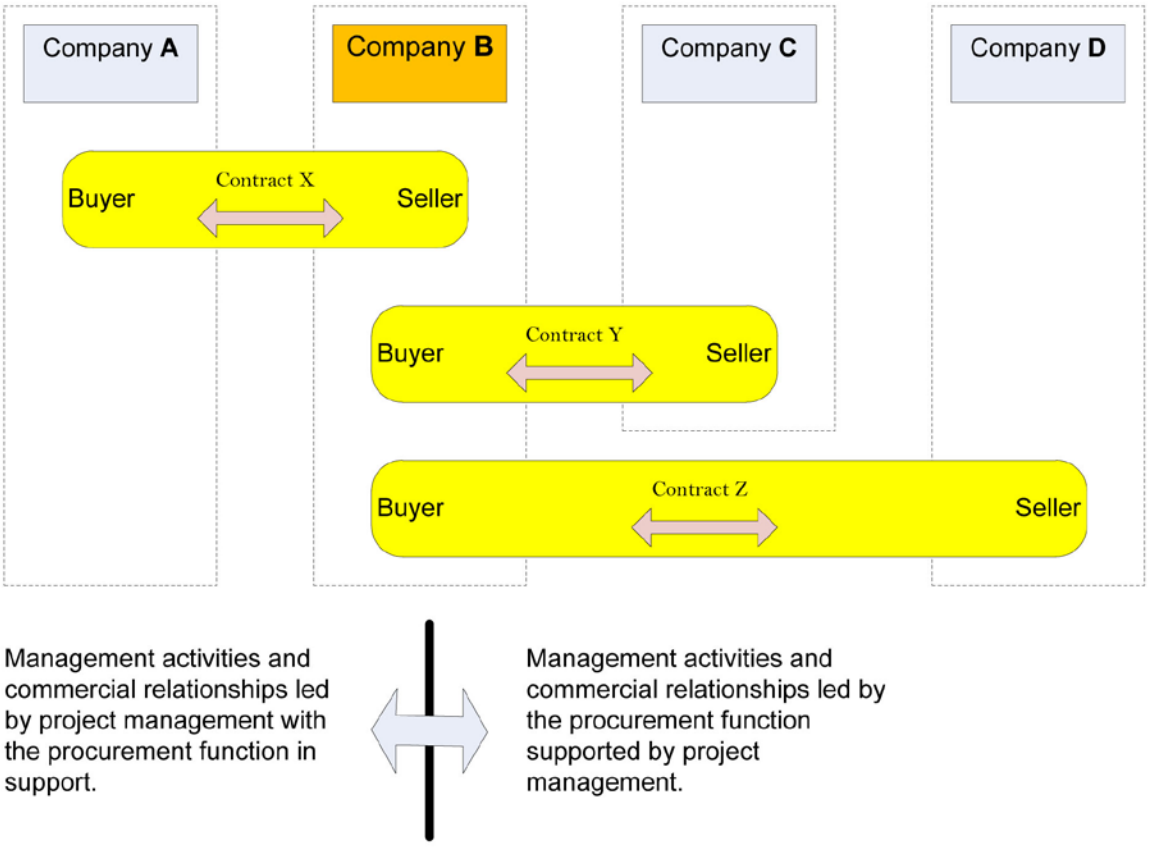


Figure 15.1

Interorganisational contractual relationships

Figure 15.1 above is typical of the contractual relationships that exist between companies operating in the project and commercial environment. It is important that you understand the processes which lead up to these contractual relationships because they are not adequately addressed in the textbook. The processes may take many forms; a basic one is as follows:

- Company A has identified a need which it cannot satisfy internally. As a result, Company A makes the effort to generate a document which defines their need (requirement) as accurately and comprehensively as possible. If their requirements are very complex, they may even generate an internal project just to do this. When complete, Company A approaches the market (which includes Company B) and releases a RFQ, inviting them to quote (tender) for the work. This process is quite common, especially for government and parastatal-related work.
- Company B receives the RFP and decides to bid for the work (see study unit 3). If Company A's need is large and/or very complex, Company B may even register an internal project (with a project manager) to prepare a commercial proposal. In preparing the proposal, Company B goes through many actions (study units 5, 6, 7, 8 and 9) at a level sufficient to provide a high level of confidence. Company B then makes Company A an offer to do the work. This offer is represented by a proposal.
- Company A receives many proposals from various interested parties (which includes Company B) and evaluates these using various selection criteria (study Larson and Gray, page 62). Following this, is a round (or many rounds) of negotiations

(study Larson and Gray, pages 431 to 435) between companies A and B where various aspects are clarified and misunderstandings cleared up. If companies A and B reach an agreement, a contract is signed (Contract X in figure 15.1) whereby Company A is the buyer and Company B the seller (more commonly known as the contractor).

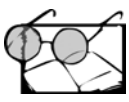
- Company B hands over the contract (the project) to the appointed project manager and it becomes the primary responsibility of the new project manager to execute the project by using the methodology described in study units 4 to 15. Since the project manager is by implication now also a contract manager, he or she is required to understand the basics of contract law and contract management.

Note:

- From the perspective of Company B, the relationship with Company A is led by project managers with other internal departments in support. If the relationship is not routine, of very high monetary value or of very high strategic importance to Company B, their executive management may also be deeply involved.
- It is now very apparent that our approach to project management throughout this course has been from the standpoint of a project manager working for a contractor (ie the seller) in a contractual relationship. Be aware that project managers work on both ends of a buyer–seller contractual relationship.
- It is highly unlikely that any company (including Company B) is so highly vertically integrated that it has the in-house capability to do all the work required by the CSOW of Contract X. It will therefore have to outsource and subcontract for materials, services, etc from other companies. In figure 15.1 Company B establishes Contracts Y and Z with companies C and D. Note that Company B has become both a buyer and a seller, depending on whether Contract X, Y or Z is being considered.
- The project manager of Company B may or may not be intimately involved with companies C and D, but the business relationship is usually led by another functional department (ie the procurement department). The process followed to establish contracts Y and Z has the same pattern of using RFPs and proposals, although Company B is now the buyer and not the seller as was previously the case.

Figure 15.1 is an example of external contracting between companies A, B, C and D. Internal contracting follows a similar procedure, the fundamental differences being that contracting is between functions and departments (not companies) and the business relationship is a lot less formal (less sophisticated paperwork and a lot less paperwork).

15.2 THE REQUEST FOR PROPOSAL (RFP)



Study pages 60 to 62 and appendix 2.1 of Larson and Gray, and the material which follows.

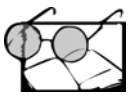
While the RFP is perhaps not the first document which will travel between a buyer and potential seller (often being preceded by declarations of interest, requests for information, etc), it is the most comprehensive document available to potential sellers

which details the full requirements of the potential buyer. The amount of thought and effort required to prepare a RFP is generally its greatest failing. In practice, incomplete and badly prepared RFPs are often released to the market. This may occur for two reasons: (1) the buyer does not have the knowledge, the interest or the professional courtesy to prepare a proper RFP or (2) the buyer has only a vague idea of their need and as a result expects the market (ie potential sellers) to provide it. In both cases, such conduct is unprofessional and sellers will most likely not respond, submit an equally unprofessional offer, or see an opportunity to act unethically and milk the situation with inflated prices, an inferior market offering or some combination of these. A professional response to an RFP (a proposal) is expensive and time consuming to prepare (perhaps costing millions and even tens of millions of Rands on big projects), and many companies will base the decision on whether to respond to a RFP on the basis of the buyer's market reputation and the quality/detail of the RFP the buyer releases.

The RFP that a potential buyer submits to the market says a lot about their understanding of their requirements and their level of professionalism. If the buyer's requirement is very complex and not easily communicated, the preparation of the RFP (or some highly technical parts of it) should be outsourced to professional consultants (eg systems or consulting engineers).

Note that the receipt of an RFP triggers potential respondents to consider a "project proposal idea" (the top block of figure 2.5 on page 46 of Larson and Gray) together with all the actions and decisions that follow.

15.3 THE PROPOSAL



Study the material which follows.

A proposal is a potential seller's response to the needs of the potential buyer, detailing how the seller will meet the needs of the buyer and formally making an offer to provide it for them. A proposal can extend from a few pages to several thousand pages, and can be very expensive and time consuming to prepare. Because of the cost and complexity involved in proposal preparation, it usually requires top management authorisation to initiate. The action of preparing the proposal often becomes a mini-project of its own, with its own project manager, and the proposal becomes the final output of the mini-project. Since the project manager is tasked with preparing the proposal, he or she becomes so intimately involved with the details and the mechanics of "his/her" proposal that he or she is often selected to manage the new project if the contract is won.

The project manager does not prepare the proposal on his or her own, but draws on the services of various responsible and highly knowledgeable people in the various functional departments around them. In exceptional cases the technical complexities may be of such a nature that subject specialists are required (outsourced). In some companies the frequency of bid preparation may be so high that they have permanent, established bid rooms staffed with a complement of dedicated estimators, schedulers and technical, financial and legal specialists.

The process of proposal preparation is typically as follows:

- Acceptance of the RFP by top management and their authorisation for a "mini" project team to continue with proposal preparation and to incur costs in doing so.
- A project management review of the client's RFP and the preparation of a detailed summary of the proposed project.
- The project team outlines the work to be done in a feasibility study and prepares a SOW (see again study unit 5). If the SOW is already provided in the RFP, it will be repeated in the proposal (unless new information reveals that additional effort is called for, in which case an amended SOW is provided).
- The project team must then "think through" the entire project and present the documentation of this process. These will include a project plan(s) (ie TCP), a WBS, and a cost and price breakdown (the subject of study units 5 to 9, topic 3). Students must note that these outputs are "rough" documents, prepared only to a level of detail sufficient to arrive at a proposal which can be accepted with a high level of confidence by the company's management. Since the contract has not yet been won, it would be nonsensical to invest a too high level of effort in the proposal preparation. How much effort to invest in proposal preparation is an executive decision.
- Final approval by top management and submission to the client, on or before the due date. If the proposal is made under competitive conditions or open tender, all submissions made late will be rejected and returned without being opened. Since the implications of tendering are very important to many companies, it is not unheard of for them to fire project managers who submit their tenders late.

The effort of preparing a proposal often raises questions which the RFP does not answer. As a result, it is common to have a constant dialogue between the buyer and companies responding to the RFP. On competitive, open tenders where it is essential to ensure fairness, it is common for the buyer to provide the answers to queries to all the potential sellers.

The exact structure of the proposal may be prescribed by the buyer with the RFQ, but will always provide the following information in some way:

Table 15.1

The basic content of a request for proposal

Section heading	Content
Executive summary	Provides an overview of the proposal and draws the reader's attention to specific areas requiring a more detailed review
Technical section	• A SOW • A statement of benefits in sufficient detail to indicate the buyer's needs are being fulfilled • An end-item delivery schedule

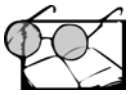
Section heading	Content
Cost and payment section	• A breakdown of hours, material and labour prices, and associated data usually required by the seller • Methods of payment and invoicing arrangements
Legal and commercial section	Contains anticipated, possible and likely problems, provisions and contingencies
Management/qualification section	Describes the seller's background and industry experience, details of company management and key project personnel (This section is designed to instil confidence in the buyer and promote the sellers suitability for the job.)

A proposal is also a marketing document and should not only give the price, schedule and other details but should also convince the buyer that the potential seller is competent and capable of doing the work. The proposal must be professionally prepared and presented in the exact format that the buyer requires. Something that is quickly scratched on the back of a cigarette box will not do. The proposal represents the company at the buyer selection process and usually represents a strong seller commitment to perform in terms of what has been stated (ie offered). Morally and ethically responsible directors and/or executives will not take the responsibility of signing a proposal on behalf of their companies lightly and will be sure that their offers are executable.

It has been said before that the preparation of a proposal is an expensive undertaking for the seller and can take weeks and even months to complete. The total costs incurred are not recoverable from the client (with certain specific exceptions) and must be written back as marketing costs or overheads. This serves to underline why it is so critically important for sellers to submit professional and commercially competitive proposals by the due date; failure to do so means thousands and even millions of Rands wasted.

From the arguments we made throughout this section, you should by now be fully convinced that a project manager is not a subject expert but should rather have a balanced technical, managerial, commercial and legal foundation in order to be effective in his or her chosen career.

15.4 SELECTING A WINNING PROPOSAL



Study the material which follows.

After receiving the proposals of all the potential sellers and discarding and returning unopened those not received by the due date, the buyer evaluates and compares them (proposal adjudication). The comparison is eased significantly if the proposal has been prepared in the prescribed format, thereby allowing the adjudicators to quickly find data for comparison. If data is not found where it is expected, frustration quickly sets in and the offending proposal discarded. During the selection process, the buyer is represented by their project manager, usually under the direction of their in-house

procurement department who are the owners of the proposal selection procedures which are followed. These procedures are designed to ensure the impartial evaluation and selection of the winning proposals and to cut out unfair and unethical practices which favour one seller over the others. Unfortunately, it is increasingly evident that these procedures – if they even exist – are not being followed diligently by our (South African) government institutions, especially in the North West province, which leads to allegations of “tenderneurship” or “lucrative contracts for my buddies”.

Nicholas and Steyn (2012:105) indicate that the selection criteria generally used in proposal evaluation and selection are

- project price
- the solution’s ability to satisfy the stated needs (solutions or technical approach)
- return on investment
- project plan and management
- qualifications and reputation of the contractor
- likelihood of success or failure (risks)
- fit to contractor resources and technological capability

In the South African business scenario we can add the following: Compliance with legal requirements (eg BEE, especially if the potential seller is tendering for government and quasi-government contracts).

In a European and US business scenario we can, to an increasing extent, add the following: Confirmation and/or a commitment that the processes and/or products used and/or delivered are environmentally friendly, safe to use, free of toxic and banned materials (eg asbestos and cadmium), were not produced with forced or child labour, etc. This last point serves to illustrate why it is so difficult for third world countries to contract and conduct business with first world countries from the position of a seller.

To aid further with proposal evaluation and selection, some companies have implemented rating systems using basic algorithms which assign weights and ratings to their selection criteria. Besides allowing some automation in the process, this approach also goes some way in reducing the human element of preferences and perceptions.

Nicholas and Steyn (2012:107) argue that in some cases, contract award depends more on the seller’s qualifications than the proposed solution. Included in these considerations are:

- Is the seller big enough to execute the contract?
- Do they have adequate finance?
- Do they have a good track record with this kind of project?
- Do they have ISO 9000/ISO 14000 certification?

Following this approach would immediately preclude any “builder with a bakkie, a wheelbarrow, a pick and two shovels” from tendering for a major bridge construction project.

In conclusion, it must be remembered that a contract is rarely awarded on the strength of proposal evaluation alone and that there is usually much negotiation and

renegotiation (and perhaps even a resubmission of an updated proposal) before a contract is awarded.

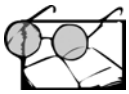
If a potential buyer is not satisfied with any of the proposal submissions received, they may

- re-issue a new updated RFP and go through the entire process again, or
- cancel their requirement and withdraw from the market entirely

The complete process of proposal submission, evaluation, negotiation, resubmission, renegotiation, etc can be extremely frustrating and tiresome, especially when dealing with projects involving public money. Be consoled by this fact: The sale of the Hawk pilot trainer jet (which first flew in 1974) to the Indian government, from the first commercial contact to contract award, took BAE Systems a reputed 24 years to achieve and cost..!!!!!

Note: By the time the Indian Air Force received their first new Hawk jet, the basic design was already 24+ years old. By way of comparison, would you buy a new boxy 1974-era VW Golf Mk1 (a 30+ year old design) at today's prices (or perhaps at a premium price) if you were offered one, no matter how much electronic wizardry is packed inside?

15.5 THE CONTRACT



Study pages 446 to 451 and appendix 12.1 of Larson and Gray, and the material which follows.

The receipt of a contract is always a highlight to the successful seller company since it goes a long way in ensuring that the company survives in the present economic climate, is able to employ people (or maintain the employment of those it has), and remains attractive to its shareholders and other stakeholders.

The contract which is awarded can take one of two basic forms, either as fixed price or cost plus. Irrespective of the final form, it is nearly always as a direct result of the contract negotiations. We stated in study unit 8 (Managing risk) that project management is risk management and that the consideration of risk is always high on a project manager's priority list. In a commercial relationship, this is first demonstrated in the seller's proposal to a potential buyer, where the seller seeks a form of contract which limits their exposure to risk (ie the left-hand side of figure A12.1 on page 450 of Larson and Gray). The potential buyer in turn also seeks to minimise exposure to risk and will offer a form of contract on the opposite end of the continuum (on the right-hand side of figure A12.1), thereby opening an important gap or area for negotiation. The final form of the contract that is awarded is a result of negotiation, the final outcome being heavily influenced by the characteristics and needs of the project itself.

Note the following important points:

- Receipt of a contract by the seller automatically implies that the project to be launched is an external one. No company issues contracts to itself (ie internally).

- A project manager of an external project is by implication also a contract manager. As a result, some organisations have dropped the term “project manager” altogether and have only contract managers.
- Once a contract is signed, the contract document moves to the head (the pinnacle) of the hierarchy of documents which the project manager has to manage. All his or her internal working and project documents must support the stipulations and requirements of the signed contract. In the event of a dispute or even litigation, the contract(s) (or contract variation order(s) if applicable) become the defining document(s).
- Receipt of a contract alone is usually not enough to start the normal business processes within the buyer and seller organisations. As a result, the buyer must also issue a purchase order, or many purchase orders, to the seller along with a contract. To put this into perspective, consider the following simple example: the seller’s ERP system will not allow the seller’s project manager to raise an invoice against the buyer unless the buyer has placed a formal purchase order on the seller. The requirements of normal business processes and ERP systems cannot be ignored. You will recall from earlier study units that setting up a project within the organisation’s internal business systems forms part of the project planning activity.

Checklist

After completing this study unit, you should be able to

- explain how the process of winning a contract works
- review a proposal for completeness
- explain how proposals are selected and evaluated
- argue why a tender process is subject to unethical practices and suggest methods to combat this
- point out why the contracts awarded have taken a particular form

EXERCISE

Answer the following review questions:

- Who pays for the preparation of a proposal?
- Who is responsible for responding to a RFP and how is this done?
- What are the fundamental differences between fixed-price and cost-plus contracts?
- For what kind of projects would you recommend that a fixed-price contract be used?
- For what kinds of projects would you recommend that a cost-plus contract be used?
- Which type of contract would you prefer in your role as contractor?
- What are redetermination contracts?
- What is an incentive clause?

Reflection

We stated in our initial introduction to the subject, in the section "Project management in perspective", that exposure and working experience in the field of project management can be an excellent training ground for more senior positions and responsibilities later on in your working career. As you progress higher up the career ladder, you will realise that a substantial part of commercial and business interaction is vested in company and contract law. What you have touched upon and learned here is another small stepping stone on the path to acquiring this essential knowledge.

SUMMARY

All projects are initiated to fill a need (a user or a buyer need). If projects are executed for external clients (ie an external project, in project management terminology), a contract is negotiated between the parties (the buyer and the seller) detailing what each party will do in terms of the agreement.

In the seller's organisation, the contract is given to a project manager to execute – which is why the career of project manager has become synonymous with that of contract manager. In the buyer's organisation, the project may be managed by either a project manager of by some other procurement department personnel.

A contract is a binding, legal agreement between the parties which details their commercial, financial, managerial and legal relationship. Since the contract is given to a project manager to execute, it is vital that he or she has a basic knowledge of contracts and contract management.

Note that the subject of project management is much wider than what we discussed in this introductory material. Interested students should consult the following book for a more detailed discussion, especially with regard to the South African business environment:

Steyn, S, Carruthers, M, Du Plessis, Y, Kruger, D, Kuschke, B, Van Eck, S & Visser, K. 2012. *Project management: A multi-disciplinary approach*. 3rd edition. Pretoria: FPM Publishing.