

Introduction to Project Management



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OPM Creator: Project Management Skills E-book.

Introduction

This OPM creator e book provides an introduction to project management. By working through the e book you will gain the skills which will help you to manage your projects more effectively and also gain the most benefit from the OPM Creator system.

Contents

In the e book we will be looking at these tools;

- Estimating time accurately through utilising Drill Down.
- Scheduling simple projects.
- Gantt Charts as a tool for planning and scheduling complex projects
- Effective planning for medium or large projects; the Planning Cycle and grid analysis

By working through each section you will understand how to plan and schedule small and middle-sized projects; how to complete them on time and on budget. You will be given the skills to identify the critical tasks and which deadlines are most important to meet. You will also learn how and when to take remedial action to bring a project back on course.

These skills will equip you to effectively manage small and medium-sized projects and will allow you to balance the constraints of time, cost and scope/quality which are present in all projects.

The final section provides an overview of managing larger projects, where a practical approach can often be snowed under by the sheer complexity of the projects being run. Such projects benefit from formal, methodology-based project management and although this is a specialism in its own right, the pointers given in the final section will provide information and training to help you further develop your project management skills.



Section One - Estimating Time Accurately

This section discusses how to estimate time when managing projects.

Accurate time estimation is an essential skill to good project management for two main reasons:

1. Time estimates drive the setting of deadlines for delivery of projects, and consequently will affect peoples' assessments of your reliability.
2. Time estimates often determine the pricing of contracts and therefore their profitability.

Generally people vastly underestimate the time needed to carry out tasks, especially if they are not familiar with the task to be carried out. Often this can be simply through not adequately accounting for unexpected events, unscheduled high priority work or by simply failing to understand the full complexity involved within a particular job.

The first stage in estimating time accurately is to fully understand what you need to achieve. This involves reviewing the task in detail so that there are no unknowns. Inevitably it is the difficult to understand, tricky problems that take the greatest amount of time to solve.

Key points:

- You can lose a great deal of credibility by underestimating the length of time needed to implement a project. If you underestimate time, not only do you miss deadlines, you also put other project workers under unnecessary stress. Projects will become seriously unprofitable, and other tasks cannot be started.
- The first step towards making good time estimates is to fully understand the problem to be solved. You can then prepare a detailed list of tasks that must be achieved. This list should include all the administrative tasks and meetings you need to carry out as well as the work itself.
- Finally, allow time for all the expected and unexpected disruptions and delays to work that will inevitably happen.
- The best way to review the job is to list all tasks in full detail. Simple techniques such as Drill Down are useful for this.

Drill Down

Drill Down is a simple technique for breaking complex problems down into progressively smaller parts.

To use the technique, start by writing the problem down on the left-hand side of a large sheet of paper. Next, write down the points that make up the next level of detail on the problem a little to the right of this. These may be factors contributing to the problem, information relating to it, or questions raised by it. This process of breaking the problem down into component parts is called 'drilling down'.

For each of these points, repeat the process. Keep on drilling down into points until you fully understand the factors contributing to the problem. If you cannot break them down using the knowledge you have, then you need to carry out whatever research is necessary to understand the point.

Drilling into a question helps you to get a much deeper understanding of it. The process helps you to recognise and understand the factors that contribute to it. Drill Down prompts you to link in information that you had not initially associated with a problem. It also shows exactly where you need further information.

Example:

The owner of a windsurfing club is having complaints from its members about the unpleasant quality of the water close to the clubhouse. This seems like a huge problem. She carries out the analysis in Figure 1:

This gives her a starting point in which to begin thinking about the problem. It highlights where she does not fully understand the problem, and shows where she needs to carry out further research.

Key points:

'Drill Down' helps you to break a large and complex problem down into its component parts, so that you can develop plans to deal with these parts. It also shows you which points you need to research in more detail.

Once you have a detailed list of all the tasks that you must achieve, make your best guess at how long each task will take to complete.

Ensure that within your estimate you also allow time for project management, detailed project planning, liaison with outside bodies, meetings, quality assurance and any supporting documentation necessary.

Also make sure that you have allowed time for:

- Other high urgency tasks to be carried out which will have priority over this one
- Accidents and emergencies
- Internal meetings
- Holidays and sickness in essential staff
- Contact with other customers, perhaps to arrange the next job
- Breakdowns in equipment
- Missed deliveries by suppliers
- Interruptions
- Quality control rejections

If the accuracy of time estimates is critical, you may find it effective to develop a systematic approach to including these factors. If possible, base this on past experience.

Section two - Scheduling Simple Projects

Simple projects usually involve a few people over a short time. Typically, simple projects will have few tasks dependent on other tasks and will be relatively simple and easy to coordinate. Examples might be coordinating delivery of resources for a workshop session, implementing a small marketing plan, or delivering a simple software enhancement.

With simple projects, tools like Gantt Charts and Critical Path Diagrams may overcomplicate project scheduling and communication. Unless project team members are trained in their use, they can often blind people with science, leading to poor communication and muddled projects.

Appropriate Timetables and Action Plans are often sufficient to coordinate and implement simple projects. These should be explained and negotiated with project staff to improve the plans and get staff understanding, input and buy-in.

Key points:

- Simple projects are often best run using simple Timetables and Action Plans. These should be prepared and negotiated with project staff to get buy-in and progress the plans.
- During the project the action plan will contain sufficient control points and deliveries to monitor project progress and take any appropriate remedial action.

Action Plans - Small Scale Planning

An Action Plan is a simple list of all of the tasks that you need to carry out to achieve the objective. It differs from a To Do list in that it focuses on the achievement of a single goal.

Drawing up an Action Plan helps you think about what you need to do to achieve the goal, it ensures you get the appropriate help where you need it and keeps the project running on time through monitoring your progress.

To draw up an Action Plan, simply list the tasks that you need to carry out to achieve your goal, in the order that you need to complete them. This is very simple, but is still very useful. Keep the Action Plan by you as you carry out the work and update it as you go along with any additional activities that come up.

Key points:

- An Action Plan is a list of things that you need to do to achieve a goal. To use it, simply carry out each task in the list.
- An Action Plan will often be enough to create a work back schedule, starting from the date by which the project must be completed, and listing all of the tasks in reverse order with due dates for each.
- Whatever the size of your project; ensure that you have agreed its scope with the person who wants it done, before you start planning. This will help you to resist changes to its scope - known as "scope creep", which will seriously affect your plans, once you have started working.



Section three - Gantt Charts as a tool for planning and scheduling complex projects

Gantt Charts are useful tools for analysing and planning complex projects.

Using Gantt charts will:

- help you to plan out the tasks that need to be completed;
- give you a basis for scheduling when these tasks will be carried out;
- allow you to plan the allocation of resources needed to complete the project, and
- help you to work out the critical path for a project where you must complete it by a particular date.

When a project is under way, Gantt Charts help you to monitor whether the project is on schedule. It also allows you to identify when a project is running behind schedule and to identify the necessary remedial actions.

Sequential and parallel activities:

An essential concept behind project planning is that some activities are dependent on other activities being completed first. These dependent activities need to be completed in a sequence, with each stage being adequately completed before the next activity can begin. Dependent activities are called 'sequential' or 'linear'. Other activities, which are not dependent on completion of any other tasks and may be done at any time before or after a particular stage is reached, are called nondependent or 'parallel' tasks.

To draw up a Gantt diagram, follow these steps:

1. List all activities in the plan

For each task, show the earliest start date, estimated length of time it will take, and whether it is parallel or sequential. If tasks are sequential, show which stages they depend on.

You will end up with a task list like the one in figure 1. This example shows the task list for a custom-written computer project. We will use this same example for both this section and the section on Critical Path Analysis and PERT. This will allow you to compare the results of the two approaches.

Figure 1. Gantt Chart Example: Planning a custom-written computer project
 NB: The start week shows when resources become available. Whether a task is parallel or sequential depends largely on context.

| Task | possible start | Length | Type | Dependent on... |
|---|----------------|---------|------------|-----------------|
| 1. High level analysis | week 1 | 5 days | sequential | |
| 2. Selection of hardware platform | week 1 | 1 day | sequential | 1 |
| 3. Installation and commissioning of hardware | week 3 | 2 weeks | parallel | 2 |
| 4. Detailed analysis of core modules | week 1 | 2 weeks | sequential | 1 |
| 5. Detailed analysis of supporting utilities | week 1 | 2 weeks | sequential | 4 |
| 6. Programming of core modules | week 4 | 3 weeks | sequential | 4 |
| 7. Programming of supporting modules | week 4 | 3 weeks | sequential | 5 |
| 8. Quality assurance of core modules | week 5 | 1 week | sequential | 6 |
| 9. Quality assurance of supporting modules | week 5 | 1 week | sequential | 7 |
| 10. Core module training | week 7 | 1 day | parallel | 6 |
| 11. Development of accounting reporting | week 6 | 1 week | parallel | 5 |
| 12. Development of management reporting | week 6 | 1 week | parallel | 5 |
| 13. Development of management analysis | week 6 | 2 weeks | sequential | 5 |
| 14. Detailed training | week 7 | 1 week | sequential | 1-13 |
| 15. Documentation | week 4 | 2 weeks | parallel | 13 |

2. Head up graph paper with the days or weeks through to task completion

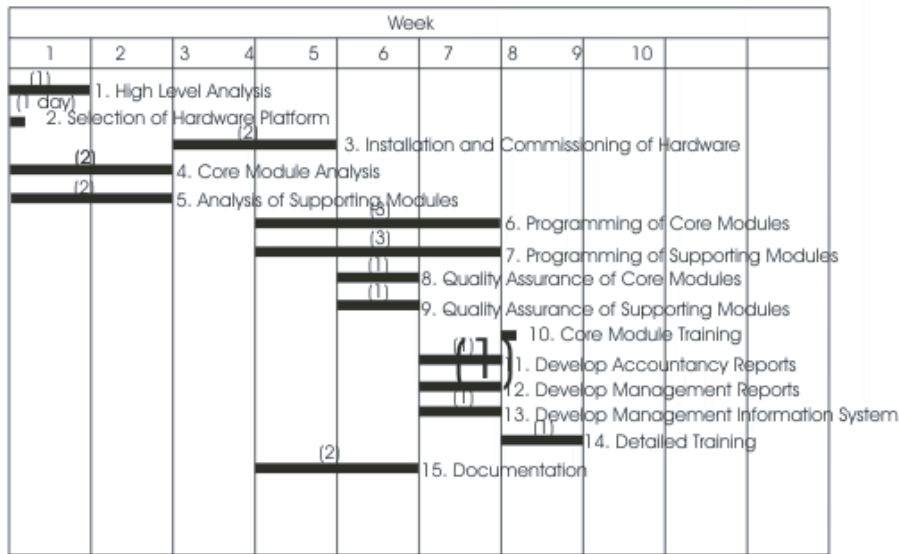
3. Plot the tasks onto the graph paper

Next, draw up a rough draft of the Gantt chart. Plot each task on the graph paper, showing it starting on the earliest possible date. Draw it as a bar, with the length of the bar being the length of the task. Above the task bars, mark the time taken to complete them. Do not worry about task scheduling yet. All you are doing is setting up the first draft of the analysis.



This will produce an untidy diagram like the one below:

Figure 2: Draft Gantt Chart: Example Computer Project



4. Schedule Activities

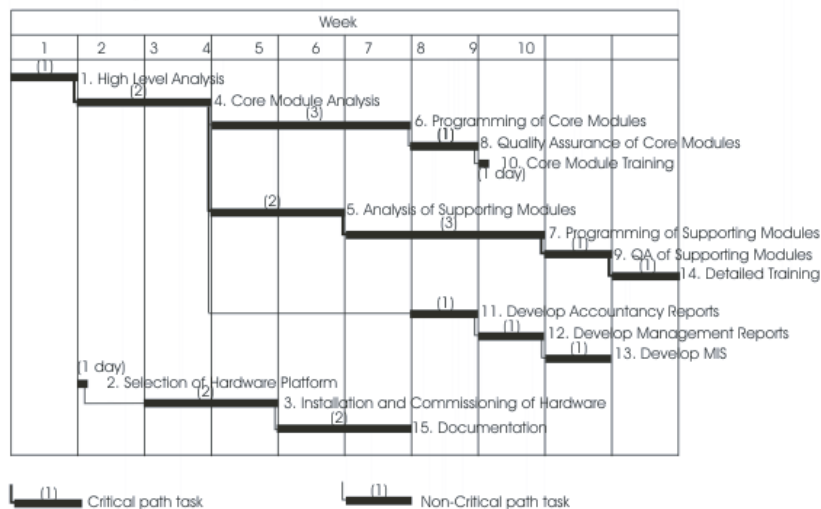
Now take the draft Gantt chart, and use it to schedule actions. Schedule them in such a way that sequential actions are carried out in the required sequence. Ensure that dependent activities do not start until the activities they depend on have been completed. Where possible, schedule parallel tasks so that they do not interfere with sequential actions on the critical path. While scheduling, ensure that you make best use of the resources you have available, and do not over-commit resource. Also allow some slack time in the schedule for delays, overruns, quality rejections, failures in delivery, etc.

5. Presenting the Analysis

The final stage in this process is to prepare a final version of the Gantt chart. This should combine the draft analysis (see above) with your scheduling and analysis of resources. This chart will show when you anticipate that jobs should start and finish.

A redrawn and scheduled version of the example project is shown below:

Critical Path Analysis: Activities Scheduled on a Gantt Chart



By drawing this example Gantt chart, you can see that:

- If all goes well, the project can be completed in 10 weeks
- If you want to complete the task as rapidly as possible, you need:
 - 1 analyst for the first 5 weeks
 - 1 programmer for 6 weeks starting week 4
 - 1 programmer for 3 weeks starting week 6
 - Quality assurance resource for weeks 7 and 9
 - Hardware to be installed by the end of week 7
- Analysis, development and installation of supporting modules are essential activities that must be completed on time.
- Hardware installation is a low priority task as long as it is completed by the end of week 7

While this section describes how to draw a Gantt chart manually, in practice project managers tend to use software tools like OPM Creator task manager to create Gantt Charts.

OPM Creator task manager helps you to quickly and easily draw Gantt Charts, it also helps you modify plans easily and provides an easy to use tool for monitoring progress.

Key points:

- Gantt charts are useful tools for planning and scheduling projects. They allow you to assess how long a project should take, determine the resources needed, and lay out the order in which tasks need to be carried out. They are useful in managing the dependencies between tasks.
- When a project is under way, Gantt charts are useful for monitoring its progress. You can immediately see what should have been achieved at a point in time, and can therefore take remedial action to bring the project back on course. This can be essential for the successful and profitable implementation of the project.



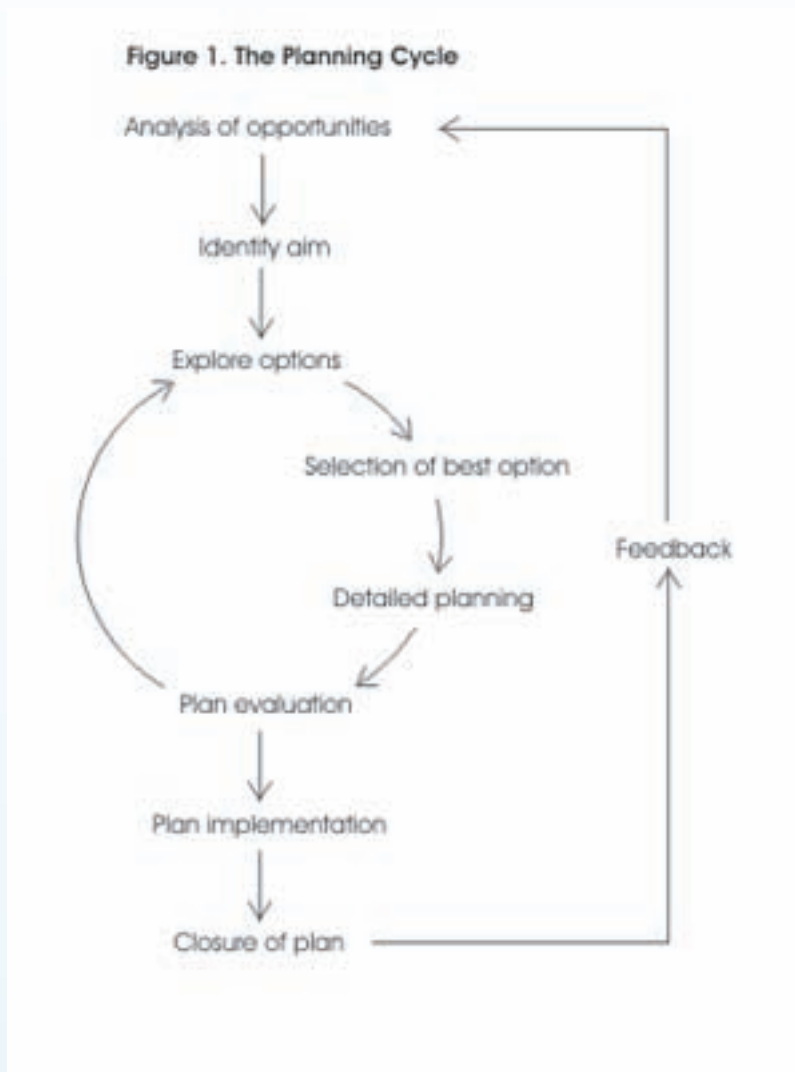
Section four - the Planning Cycle

The Planning Cycle brings together all aspects of planning into a coherent, unified process and is a planning process used most often for medium sized projects.

By planning within this structure, you will ensure that your plans are fully considered, well focused, resilient, practical and cost-effective. You will also ensure that you learn from any mistakes you make, and feed this back into future planning and decision making.

Planning using this cycle will help you to plan and manage ongoing projects up to a certain level of complexity. For projects involving many people over a long period of time, more formal methodologies and approaches are necessary

The Planning Cycle is shown in figure 1:



The stages in this planning process are explained below:

1. Analysis of Opportunities:

The first thing to do is to identify what needs to be done. You will develop this into a formal aim at the next stage in the process. One approach to this is to examine your current position, and decide how you can improve it. There are a number of techniques that will help you to do this:

SWOT Analysis. This is a formal analysis of your strengths and weaknesses, and of the opportunities and threats that you face.

Risk Analysis. This helps you to spot project risks, weaknesses in your organisation or operation, and identify the risks to which you are exposed. From this you can plan to neutralise some risks.

Understanding pressures for change:

Alternatively, other people (e.g. clients) may be pressing you to change the way you do things. Alternatively your environment may be changing, and you may need to anticipate or respond to this.

Pressures may arise from changes in the economy, new legislation, competition, changes in people's attitudes, new technologies, or changes in government.

2. Identifying the Aim of Your Plan

Once you have completed a realistic analysis of the opportunities for change, the next step is to decide precisely what the aim of your plan is. Deciding and defining an aim sharpens the focus of your plan, and helps you to avoid wasting effort on irrelevant side issues.

The aim is best expressed in a simple single sentence. This ensures that it is clear and sharp in your mind.

You can present this aim as a 'Vision Statement' or 'Mission Statement'.

Vision Statements express the benefit that an organisation will provide to its customers. Mission statements give concrete expression to the Vision statement, explaining how it is to be achieved.

3. Exploring Options

By this stage you should know where you are and what you want to do. The next thing to do is to work out how to do it.

At this stage it is best to spend a little time generating as many options as possible, even though it is tempting just to grasp the first idea that comes to mind. By taking a little time to generate as many ideas as possible you may come up with less obvious but better solutions. Just as likely, you may improve your best ideas with parts of other ideas.

4. Selecting the Best Option

Once you have explored the options available to you, it is time to decide which one to use. If you have the time and resources available, then you might decide to evaluate all options, carrying out detailed planning, costing, risk assessment, etc. for each. Normally you will not have this luxury.

The useful tool for selecting the best option is Grid Analysis; this helps you to decide between different options where you need to consider a number of different factors. Decision Trees help you to think through the likely outcomes of following different courses of action.

5. Detailed Planning

By the time you start detailed planning, you should have a good picture of where you are, what you want to achieve and the range of options available to you. You may well have selected one of the options as the most likely to generate the best results.

Detailed planning is the process of working out the most efficient and effective ways of achieving your aim. It is the process of determining who will do what, when, where, how and why, and at what cost.

When drawing up the plan, techniques such as use of Gantt Charts can be immensely helpful in working out priorities, deadlines and the allocation of resources.

While you are concentrating on the actions that need to be performed, ensure that you also think about the control mechanisms that you will need to monitor performance. These will include the activities such as reporting, quality assurance, cost control, etc. that are needed to spot and correct any deviations from the plan.

A good plan will:

- State the current situation
- Have a clear aim
- Use the resources available
- Detail the tasks to be carried out, whose responsibility they are, and their priorities and deadlines.
- Detail control mechanisms that will alert you to difficulties in achieving the plan.
- Identify risks, and plan for contingencies. This allows you to make a rapid and effective response to crises, perhaps at a time when you are at low ebb or are confused following a setback.
- Consider transitional arrangements - how will you keep things going while you implement the plan?

6. Evaluation of the Plan and its Impact

Once you have worked out the details of your plan, the next stage is to review it to decide whether it is worth implementing. Here you must be objective - however much work you have carried out to reach this stage, the plan may still not be worth implementing.

This is frustrating after the hard work of detailed planning. It is, however, much better to find this out now than when you have invested time, resources and personal standing in the success of the plan. Evaluating the plan now gives you the opportunity to either investigate other options that might be more successful, or to accept that no plan is needed or should be carried out.

Depending on the circumstances, the following techniques can be helpful in evaluating a plan:

- **PMI (Plus/Minus/Interesting):**
This is a good, simple technique for 'weighing the pros and cons' of a decision. It involves listing the plus points in the plan in one column, the minus points in a second column, and the implications and points of uncertainty of the plan in a third column. Each point can be allocated a positive or negative score.
- **Cost/Benefit Analysis:**
This is useful for confirming that the plan makes financial sense. This involves adding up all the costs involved with the plan, and comparing them with the expected benefits.
- **Force Field Analysis:**
Similar to PMI, Force Field Analysis helps you to get a good overall view of all the forces for and against your plan. This allows you to see where you can make adjustments that will make the plan more likely to succeed.
- **Cash Flow Forecasts:**
Where a decision is has a mainly financial implication, such as in business and marketing planning, preparation of a Cash Flow Forecast can be extremely useful. It allows you to assess the effect of time on costs and revenue. It also helps in assessing the size of the greatest negative and positive cash flows associated with a plan. When it is set up on a spreadsheet package, a good Cash Flow Forecast also functions as an extremely effective model of the plan. It gives you an easy basis for investigating the effect of varying your assumptions.

7. Implementing Change

Once you have completed your plan and decided that it will work satisfactorily, it is time to implement it. This information will be contained in the plan which will also detail the controls that you will use to monitor the execution of the plan.

8. Closing the Plan

Once you have achieved a plan, you can close the project. At this point is often worth carrying out an evaluation of the project to see whether there are any lessons that you can learn. This should include an evaluation of your project planning to see if this could be improved. If you are going to be carrying out many similar projects, it may be worth developing and improving an Aide Memoire. This is a list of headings and points to consider during planning. Using it helps you to ensure that you do not forget lessons learned in the past.

Key points:

- The Planning Cycle is a process that helps you to make good, well-considered, robust plans.
- The first step, the analysis of opportunities, helps you to base the plan firmly in reality. The second, definition of the aim, gives your plan focus.
- The third stage is to generate as many different ways for achieving this aim as possible. By spending time looking for these you may find a better solution than the obvious one, or may be able to improve the obvious solution with parts of other ones.
- Next select the best approach, and make a detailed plan showing how to implement it. Evaluate this plan to make sure that it will be worth implementing. If it is not, return to an earlier stage and either improve the plan or make a different one. If no plan looks like producing enough benefit to justify the cost, make no changes at all.
- Once you have selected a course of action, and have proved that it is viable, carry it out. Once it is finished, examine it and draw whatever lessons you can from it. Feed this back into future planning.

Grid Analysis

Grid Analysis is also known as Decision Matrix Analysis, Pugh Matrix Analysis or MAUT which stands for Multi-Attribute Utility Theory. This is a useful technique to use when making a decision. Decision matrices are most effective where you have a number of good alternatives and many factors to take into account.

The first step is to list your options and then the factors that are important for making the decision.

| | | | | | | | | |
|-----------------|--|--|--|--|--|--|--|--------------|
| Factors: | | | | | | | | TOTAL |
| Weights: | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Lay the options out on the table, as above, with options as the row labels, and factors as the column headings.

Next, work out the relative importance of the factors in your decision. Show these as numbers. We will use these to weight your preferences by the importance of the factor.

The next step is to work your way across your table, scoring each option for each of the important factors in your decision. Score each option from 0 (poor) to 3 (very good). Note that you do not have to have a different score for each option - if none of them are good for a particular factor in your decision, then all options should score 0.

Now multiply each of your scores by the values for your relative importance. This will give them the correct overall weight in your decision.

Finally add up these weighted scores for your options. The option that scores the highest wins!



Example:

A windsurfing enthusiast is about to replace his car. He needs one that not only carries a board and sails, but also that will be good for business travel. He has always loved open-topped sports cars. No car he can find is good for all three things.

His options are:

- A four wheel drive (4x4), hard topped vehicle
- A comfortable 'family car'
- An estate car
- A sports car
- Criteria that he wants to consider are:

Cost

- Ability to carry a sail board at normal driving speed
- Ability to store sails and equipment securely
- Comfort over long distances
- Fun!
- Nice look and build quality to car
- Firstly he draws up the table shown in Figure 1, and scores each option by how well it satisfies each factor:

Figure 1: Example Grid Analysis Showing Unweighted Assessment of How Each Type of Car Satisfies Each Factor

| Factors: | Cost | Board | Storage | Comfort | Fun | Look | Total |
|------------|------|-------|---------|---------|-----|------|-------|
| Weights: | | | | | | | |
| Sports Car | 1 | 0 | 0 | 1 | 3 | 3 | |
| 4x4 | 0 | 3 | 2 | 2 | 1 | 1 | |
| Family Car | 2 | 2 | 1 | 3 | 0 | 0 | |
| Estate Car | 2 | 3 | 3 | 3 | 0 | 1 | |

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| Factors: | Cost | Board | Storage | Comfort | Fun | Look | Total |
|------------|------|-------|---------|---------|-----|------|-------|
| Weights: | 4 | 5 | 1 | 2 | 3 | 4 | |
| Sports Car | 4 | 0 | 0 | 2 | 9 | 12 | 27 |
| 4x4 | 0 | 15 | 2 | 4 | 3 | 4 | 28 |
| Family Car | 8 | 10 | 1 | 6 | 0 | 0 | 25 |
| Estate Car | 8 | 15 | 3 | 6 | 0 | 4 | 36 |

This gives an interesting result: Despite its lack of fun, an estate car may be the best choice.

If the wind-surfer still feels unhappy with the decision, maybe he has underestimated the importance of one of the factors.

Key points:

Grid Analysis helps you to decide between several options, while taking many different factors into account.

To use the tool, lay out your options as rows on a table. Set up the columns to show your factors. Allocate weights to show the importance of each of these factors. Score each choice for each factor using numbers from 0 (poor) to 3 (very good). Multiply each score by the weight of the factor, to show its contribution to the overall selection. Finally add up the total scores for each option. Select the highest scoring option.

Congratulations, you have now completed the OPM Creator e book – helping you to manage your projects more effectively. Log on to www.opmcreator.com and start to make it happen.

