Project Life Cycle

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Introduction
A project life cycle is a sequence of distinct phases characterised by the nature of work undertaken and the results. The life cycle of a project effectively follows the natural 'cradle to grave' principles: initially the project is conceived, developed, a product emerges which is set to work and when no longer useful, is terminated.

It is the sequence of these phases from the beginning to the end of a project that describes its life cycle. Understanding the characteristics of phases, their outputs and their function in the life of a project is important in the management of the project. It enables a structured approach to be taken and provides natural breakpoints for stakeholders to review and control project activities and outputs.

This topic defines the APM’s project life cycle and explains the benefits of a structured life cycle approach in managing projects.

Reference material
APM BOK 5th Edition, sections:

- 6.1 Project life cycles
- 6.2 to 6.5 Concept to Handover Phases
- 6.6 Project Reviews

Generic life cycle
The key phases of a simple generic project life cycle are shown in Figure 1 and described below:

Conceive – Initially some need is identified. This may be driven internally by the organisations strategy, or externally by changes in the organisation’s context. It may be an opportunity to provide a new product to generate revenue, a product to support a transformation programme, or to deal with
a problem such as replacing obsolete equipment used in day to day operations.

**Develop** – the need is defined and developed into a set of key requirements, strategies and designs to enable the product to be produced. Alternative designs may be evaluated, the final product design selected and optimised, and specifications and information produced to enable the product to be made.

**Produce** – the product is produced, tested and handed over to the users.

**Use** – users set the product to work and use it to obtain benefits.

**Terminate** – when the product is no longer useful, it is taken out of use.

![Figure 1 Generic Project Life Cycle](image-url)
Risk Reduction

The ‘natural’ boundaries between phases and stages provide convenient break points to evaluate the continuing viability of the project. Gates also provide an opportunity to review performance, learn lessons and make improvements.

The most significant difficulty facing a project team is generally the management of uncertainty and risk. A structured approach based on a gated lifecycle can provide important benefits in managing and controlling exposure to uncertainty and risk as follows.

Figure 2 shows the uncertainty v spend profile during a typical project. At the beginning, uncertainty is at its highest. Uncertainty reduces as more information becomes available through project activity. The spend profile is the opposite. It is at its lowest at the beginning and usually at its highest at product handover.

If the project is terminated prematurely and early in the life cycle, consequential losses are typically low. Thus whilst there may be a higher chance of failure at the front end, the impact will be minimal. However, if the project is terminated much later and before delivery to users, spend will be nearing its peak and the impact...
may be much greater. In some case unsustainable by the organisation. Such cases affected in this way are the Airbus 380, Scottish Parliament Building, the London Millennium Bridge, Rolls-Royce RB211 and the Beechcraft Starship project (information on these projects can be found through the wikipedia website).

To address the problem, formal stages may be introduced to review the level of exposure and allow termination if too high, as shown in figure 3.

Also shown in figure 3, proactive measures can be taken to drive the uncertainty profile down early in the life cycle, for example through data gathering and experimentation.

Spend may also be held by prioritising work to focus on more difficult, high risk areas and leaving less risky areas until later in the life cycle. As a rule of thumb, project management should aim to keep investment inversely proportional to uncertainty. Control points provided by formal gates enable stakeholders to consider this balance and make changes to the strategy to reflect the overall risk in the venture. The principle also ensures that non-viable projects are terminated early rather than later.

Figure 3 Risk Reduction
Consequently, the Definition Phase of a project provides a great opportunity to reduce risk through proactive measures and is therefore often characterised by prototyping, technology demonstration and pilot studies.

However there is a particular dilemma arising from this approach. Many stakeholders want to see some progress early in a project and simply do not want to hear about the uncertainties, problems and difficulties in the project. An illusion of progress can be achieved by doing easier tasks rather than the most difficult ones, whereas meaningful progress can only be achieved by overcoming the difficult things. The more effective approach is obviously to place greater priority on more difficult areas. To overcome this dilemma requires a shift in cultural attitude from quick fix to quick learn. In other words, targets have to be set to reduce risk and uncertainty rather than creating the illusion of progress.

The APM Project Life Cycle

The APM Project Life Cycle is fully described in APM BOK v 5: ‘6.1 Project Life Cycles’ and shown in figure 4. Figure 4 also shows two key documents that are used throughout the project life cycle: Business Case and Project Management Plan. These documents are used in conjunction with key project reviews, also shown in figure 4, and it is obviously important that the project sponsor and manager agree the frequency and number of reviews at the start of the project.

Characteristics of the main phases are as follows:

**Concept** – the need, problem or opportunity is confirmed and a feasibility study undertaken. The preferred option is selected and the business case produced.

**Definition** – the preferred option is evaluated, risk reduced, and the design optimised. Usually through a number of iterations, the product and project criteria are refined and detailed. Plans are produced for the management and implementation of the project. A project management plan is produced and authorised by the sponsor.
**Implementation** – the project plan is executed, monitored and controlled. The design is completed and the deliverables produced.

**Handover and closeout** – the final phase of the project involves acceptance testing and formal handover of the deliverables to the project sponsor. Closeout involves closing activities, demobilisation of the team, closure of contracts, disposal of equipment, archiving documentation, audits, etc. Finally, a post project review is conducted to establish lessons learnt and recommendations for improvements.

There are two phases after project completion: operation and termination. If these are included in the life cycle, it is called an extended life cycle.

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![Figure 4: The APM Project Life Cycle](image-url)
During Operation, the project sponsor conducts benefits realisation reviews to evaluate the performance of the product in service.

**Benefits of the gated approach**

As discussed previously, a gated approach provides several benefits. These may be summarised as follows:

- **Effective Control** - high level check points to examine the validity and viability of the project

- **Risk Management** - allows risks and uncertainties to be evaluated thoroughly at gates

- **Structured Approach** - provides manageable chunks and realistic objectives to ensure greater focus and motivation.

- **Stakeholder Engagement** - enables wider stakeholder involvement at phase and stage gates rather than during phases and stages which may be disruptive – for example, users can review the product development against their requirements

- **Rolling Wave Planning** – details for near term, outlines for later phases and stages to reflect uncertainty profile. This eliminates nugatory work where detailed plans of later phases and stages would need to change to reflect changes in the project circumstances.

- **Estimating Accuracy** – estimating accuracy should improve as the project progresses through the life cycle phases. However it is often difficult to produce estimates during phases when work is in progress. Gates enable estimates to be produced against a more static baseline.

- **Improvements** – gates provide an opportunity to review lessons and plan improvements for following phases and stages.
Effects of a gated approach on project teams and stakeholders

The stakeholder and project team composition typically changes during phases and stages and more often at stage boundaries, for example from the ‘planning’ to ‘building’ stages of a construction project. Consequently problems commonly occur during the handover between teams. Gates provide opportunities to ensure that the problems and risks involved in handover are properly addressed and communicated to all key stakeholders.

A particular problem may be project continuity. Formal gates can often slow the project down and whilst this may be necessary from the sponsor’s perspective, the project team may lose motivation. Consequently start up of the next phase or stage may be more difficult. Obviously, a balance has to be achieved, and many projects will allow important activities in the following stage to be undertaken at some risk to smooth the transition between phases and stages.

Finally, users are often kept at arms length during implementation. Indeed their involvement in day to day activities can lead to unnecessary changes and cause disruption. On the other hand without their involvement, there is a risk that the product will be difficult to use or that user buy-in will be difficult to achieve, as commonly occurs. The problem can be managed effectively through requirements management processes. It can also be facilitated by using gates to involve users in providing feedback on project progress and in particular, the adequacy of the product designs.

Project Reviews

The life cycle diagram shown in figure 4 also shows typical timings for important project reviews. An overview of these key reviews is as follows:

**Project Evaluation Review:** a documented review of the project’s performance, produced at predefined points in the project life cycle. Typically involves the project manager, team and sponsor and addresses the status of the project against the project management plan including
variances against cost, time and quality, and changes in risk and scope of work.

**Gate Review:** a formal point in a project where the project’s expected worth, progress, cost and execution plan, are reviewed and a decision made whether to continue with the next phase or stage of the project. Effectively the Go/No Go viability check. The review is likely to be run by the sponsor with the project manager and team, external stakeholders including users and representatives from corporate management.

**Audits:** these are normally independent assessments and may be carried out by specialists such as project or quality assurance to check compliance with defined standards and procedures. These are discussed further in reader 302R Quality Management.

**Post Project Review:** undertaken after the project deliverables have been handed over and before final closeout, this review is intended to produce lessons learnt that will enable continuous improvement. Further information on this review is given in reader 404R Handover and Closeout.

**Benefits Realisation Review:** a review is undertaken after a period of operation to assess the effectiveness of project deliverables in meeting the planned benefits. This is also discussed in reader 203R Benefits Management.

**Benefits of Project Reviews**
Project reviews generally support project control processes by enabling stakeholders to evaluate the status of the project and take appropriate decisions to ensure the success criteria and benefits are achieved. Each of the reviews described above has a specific purpose. For example, gate reviews check the overall viability of the project. In summary reviews enable stakeholders to evaluate the situation against the baseline plan, consider adverse variances and trends, consider threats and opportunities and agree appropriate actions. Reviews also provide focus and enable lessons learnt to be reviewed and addressed.