2012

IT Project Management

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5/2/2012

IT Project Management - CWK1
Heathrow Airport Terminal 5

Contents

Question 1

Imagine you are a consultant who has been asked to write a brief report for the management of BAA, who were responsible for the building of T5.

Introduction

Project management is described as *"the planning, delegating, monitoring and control of all aspects of the project, and the motivation of those involved, to achieve the project objectives within the expected performance targets for time, cost, quality, scope, benefits and risks." (OGC, Managing Successful Projects with PRINCE2™, 2009. p.4)*

In this report the three main Project Management methodologies will be described and critically analysed with specific reference to the Heathrow Terminal 5 case study, in order for a most suitable methodology to be chosen for application to the proposed (fictitious) Terminal 6 project.

The difference, between a project and day to day management is that a project is a process where change occurs. A project is a temporary construct that is unique to the specific criteria to be addressed. There is uncertainty in any project and they are cross functional, often utilising different departmental skill-sets, married together to work towards the same ultimate goal, as set out in the business plan.

The three main project management methodologies to be discussed are; PRINCE2™, PMBOK® and Agile Techniques.

PRINCE2™

PRINCE2™, an acronym standing for **Pr**ojects **IN C**ontrolled **E**nvironments, is a project management methodology based on the experiences of numerous project managers. It is a structured method for managing projects and is the standard used by the UK government, its public sector bodies and a large number of private sector organisations.

There are four integrated elements to PRINCE2™; Principles, Themes, Processes and the tailoring to suit specific projects.

There are seven principles of PRINCE2™, and it is solely the adoption of these principles that decides whether a project is using PRINCE2™ methodology. The seven principles of PRINCE2™ can be seen in figure 1.1.0.

Continued business justification	The project must be justified at all points throughout its life. If for any reason it cannot be justified at any stage, it must be stopped.
Learn from experience	Project teams learn from previous experience. Lessons are sought, recorded, and acted upon. It is the responsibility of everyone to seek lessons learnt.
Defined roles and responsibilities	Roles and responsibilities are defined and agreed upon to satisfy the organisation, user and suppliers interests.
Manage by stages	PRINCE2™ is planned, monitored and controlled on a stage-by-stage basis.
Manage by exception	PRINCE2™ has defined tolerances. In order to make vest use of senior managers' time control is delegated within the roles and responsibilities and only at stage boundaries and if an exception is raised does the project need to be escalated.
Focus on products	The project's focus is on the output produced, and their quality requirements.
Tailor to suit the project environment	PRINCE2™ is a universal methodology and can be tailored to suit any project in terms of size, complexity, importance, environment, capability and risk.

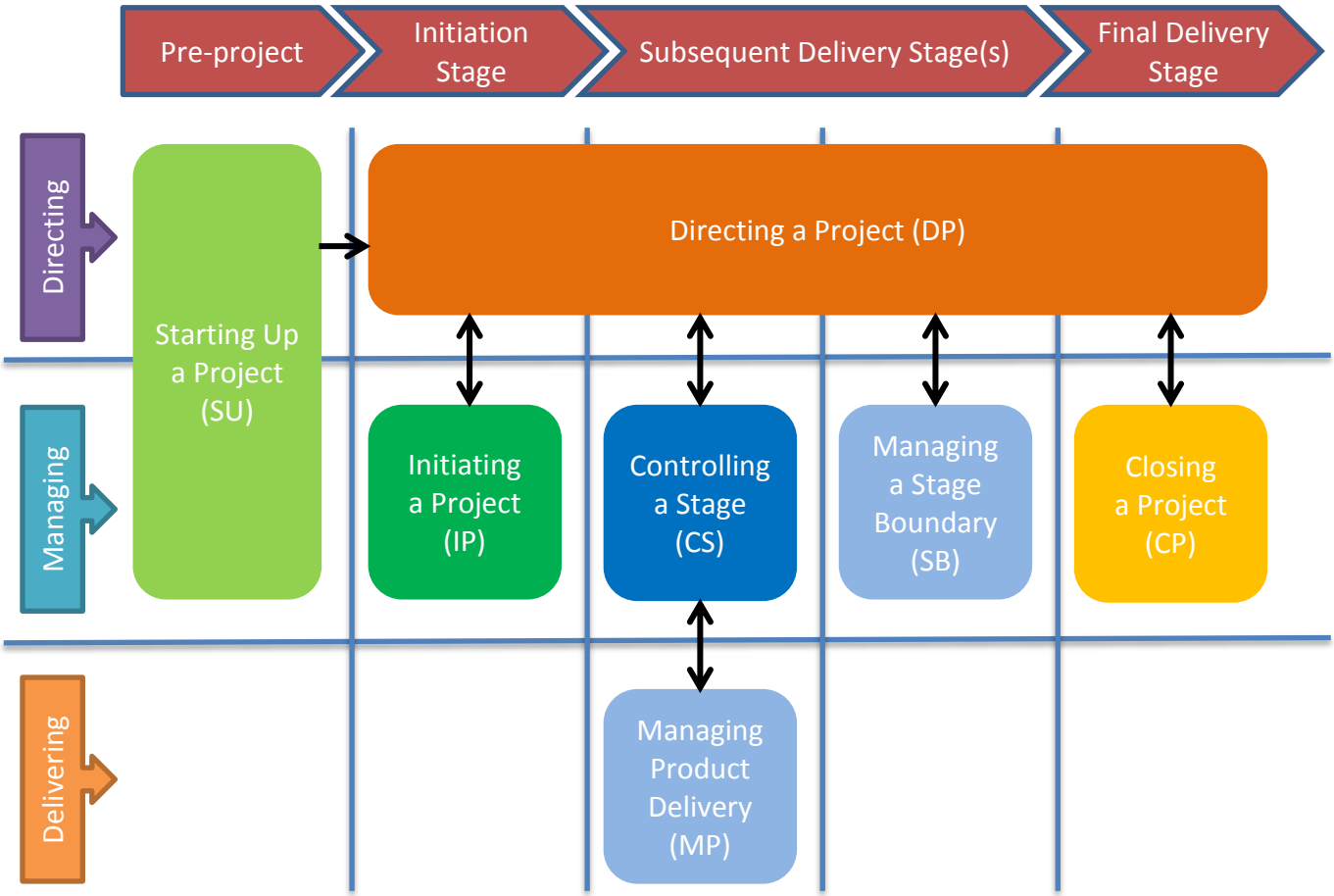
Figure 1.1.0 – Seven PRINCE2™ Principles
Adapted from; OGC, Managing Successful Projects with PRINCE2™, 2009.

In addition to the seven principles, PRINCE2™ it also has seven themes within its methodology, these have been specially designed to link together effectively; which gives PRINCE2™ its strength. These seven themes are designed to answer the key questions to any project, and can be seen in figure 1.1.1 overleaf.

Theme	Purpose	Question Answered
Business Case	To establish mechanisms to judge whether the project is desirable, viable and achievable.	Why?
Organisation	To define and establish the project's structure of accountability and responsibility.	Who?
Quality	To define and implement the means by which the project will create and verify products that are fit for purpose.	What?
Plans	To facilitate communication and control by defining the means of delivering the products.	How? How much? When?
Risk	To identify and control uncertainty and, as a result, improve the ability of the project to succeed.	What if?
Change	To identify, assess and control any potential and approved changes to the baseline.	What's the impact?
Process	To establish mechanisms to monitor and compare actual achievements against those planned; provide a forecast for the project objectives and the project's continued viability; and control any unacceptable deviations.	Where are we now? Where are we going? Should we carry on?

Figure 1.1.1 – Seven PRINCE2™ Themes
Adapted from; OGC, Managing Successful Projects with PRINCE2™, 2009.

The third element to PRINCE2™ project management methodology is its processes (see figure 1.1.2 overleaf). There are seven management processes at play in this element, and these are its structured set of activities that have each been designed to accomplish a specific objective. These management processes can be seen at the PRINCE2™ 'journey' and as used throughout the project's life.



Key	
SU –Starting up a Project	**DP –Directing a Project**
IP –Initiating a project	Authorising Initiation
SB –Managing Stage Boundaries	Authorising a Project
CS –Controlling a Stage	Authorising a Stage or Exception Plan
MP –Managing Product Delivery	Giving ad hoc Direction
CP –Closing a Project	Confirming Project Closure
DP –Directing a Project	

Figure 1.1.2 – PRINCE2™ Management Processes
Adapted from; OGC, Managing Successful Projects with PRINCE2™, 2009.

The PRINCE2™ methodology follows the above structure (in figure 1.1.2) starting with the pre-project stage. An initial idea of need, possibly as a result of competition or legislative change or any other business need could trigger the creation of a project. At the starting up stage, the executive for the project is created, containing representatives from the customer organisation, suppliers and end users (in the case of T5 the customer organisation is BAA, the end users are BA and the suppliers are the myriad of sub-contractors), this executive will

then Direct the project following all of the stages shown in the key to figure 1.1.2 under DP –Directing a Project.

Also at the setting up a project stage, the initial project brief and stage plan for initiation are drawn up to go to the executive (board) for approval. Once approval is given to commence with the project a Project Initiation Document (PID) is created, which although it is likely to change, is used to guide the project to completion. Following this stage we enter the delivery stages where a host of documents (daily logs, risk registers, lessons learnt logs, quality registers, issues logs) are used to guide the project towards the closing stage, all the while with the project managers leading the project and managing stage boundaries as they are arrived upon. At the end of the project the project is closed which entails the Project Manager gaining approval to sign off the final outputs from all members of the executive, weighed against the initial project brief.

PMBOK®

PMBOK®, The **P**roject **M**anagement **B**ook **o**f **K**nowledge, like PRINCE2™, is a project management methodology and like PRINCE2™ it is purely this without an accompanying dedicated software solution. Like PRINCE2™ it is a compilation of many years of 'best practice' and knowledge gained within the profession of project management. It is therefore a set of guidelines or 'suggestions' on how to best manage large scale projects to ensure successful completion based on the success indicators required in any project; to this end it is a generic guide that can be used on any and all projects. PMBOK® is not necessarily applied equitably on all projects; the project management team is responsible for determining what is appropriate for any given project (PMBOK® Guide, 2004).

There are five Project Management Process Groups in PMBOK® (see figure 1.2.0, overleaf). The five Project Management Process Groups are required for any project and they are not project phases. In large scale or complex projects, the process groups could be repeated for each phase. It is similar to the Stage concept in PRINCE2™. In total, there are 42 project management processes mapped into the 5 main Project Management Process Groups

(Yeong, 2009). The process groups themselves are also then linked by the outputs they produce.

Initiating Process Group	The processes that facilitate formal authorization to start a new project.
Planning Process Group	The processes used to plan and manage a successful project.
Execution Process Group	The processes used to complete the work defined in the project management plan.
Monitoring & Controlling Process Group	The processes used to observe project execution, and identify any potential problems and issues in a timely manner.
Closing Process Group	The processes used to formally close a project or project phase.

Figure 1.2.0 – PMBOK® Project Management Process Groups
Adapted from PMBOK® Guide, 2004

All of the process groups within PMBOK® follow the cycle shown in figure 1.2.1 (below), where an initial input is planned and executed, all the while being monitored, until completion of the 'phase', where it is closed and the desired output achieved.

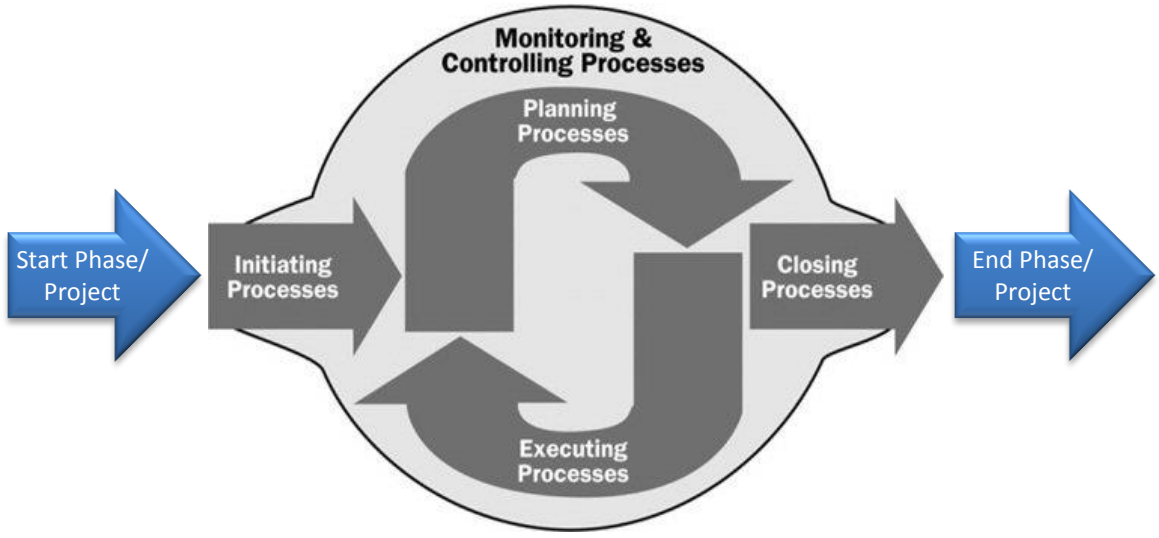


Figure 1.2.1 – PMBOK® Process Groups Cycle
Adapted from PMBOK® Guide, 2004

Combined, these process cycles form the life-cycle of the project.

On top of the five project management process groups there are nine knowledge areas of Project Management in PMBOK® (see figure 1.2.2 below):

Knowledge Area	Overview
1. Project Integration Management	The processes and activities needed to identify, define, combine, unify and co-ordinate the various processes and activities within the project.
2. Project Scope Management	The processes required to ensure that the project includes all the work required.
3. Project Time Management	The processes required to accomplish timely completion of the project.
4. Project Cost Management	The processes required to accomplish completion of the project within approved budgeted constraints.
5. Project Quality Management	The processes and activities needed to satisfy the needs for which the project was undertaken.
6. Project Human Resource Management	The processes that organise and manage the members of the project team.
7. Project Communications Management	The processes required to ensure timely and appropriate generation, collection, distribution, storage, retrieval and disposition of the project's information.
8. Project Risk Management	The processes concerned with conducting risk analysis and management of any risks or lessons learnt.
9. Project Procurement Management	The processes needed to acquire products, services or results required from outside of the project team, in order to perform work on the project.

Figure 1.2.2 – PMBOK® Knowledge areas
Adapted from PMBOK® Guide, 2004

According to PMBOK®, project management knowledge areas are the identified areas of project management defined by their knowledge requirements and described in terms of their component processes, practices, inputs, outputs, tools, and techniques. Although not exactly matched, they are similar to the PRINCE2™ themes (Yeong, 2009).

The specific activities within the process groups can be seen in figure 1.2.3 overleaf.

Figure 1.2.3 – PMBOK® Planning Process Group
From www.softexpert.com, 2012

AGILE

As opposed to PRINCE2™ and PMBOK® Agile Project Management leans less on the methodologies used and is a more asynchronous technique to managing projects. It is primarily a Project Management technique used in programming and to this end is also often software driven and software techniques are often at the heart of Agile Techniques; such as Microsoft SCRUM or XP (Extreme Programming).

Both PRINCE2™ and PMBOK® can be viewed as 'waterfall' approaches to Project Management where each process follows a cycle and groups of cycles together, one following the other, with checkpoints at each stage boundary, form the entire project from Initiation to Completion. Agile Project Management techniques however can be seen to differ (see figure 1.3.0). Whilst not entirely ad-hoc and random, there is more emphasis on freedom from tight constraints, in the hope to drive greater innovation and efficiency and parts of a project can begin and be completed asynchronously and have iterations and incremental development instead of strict process driven methodologies as seen in PRINCE2™ and PMBOK®.

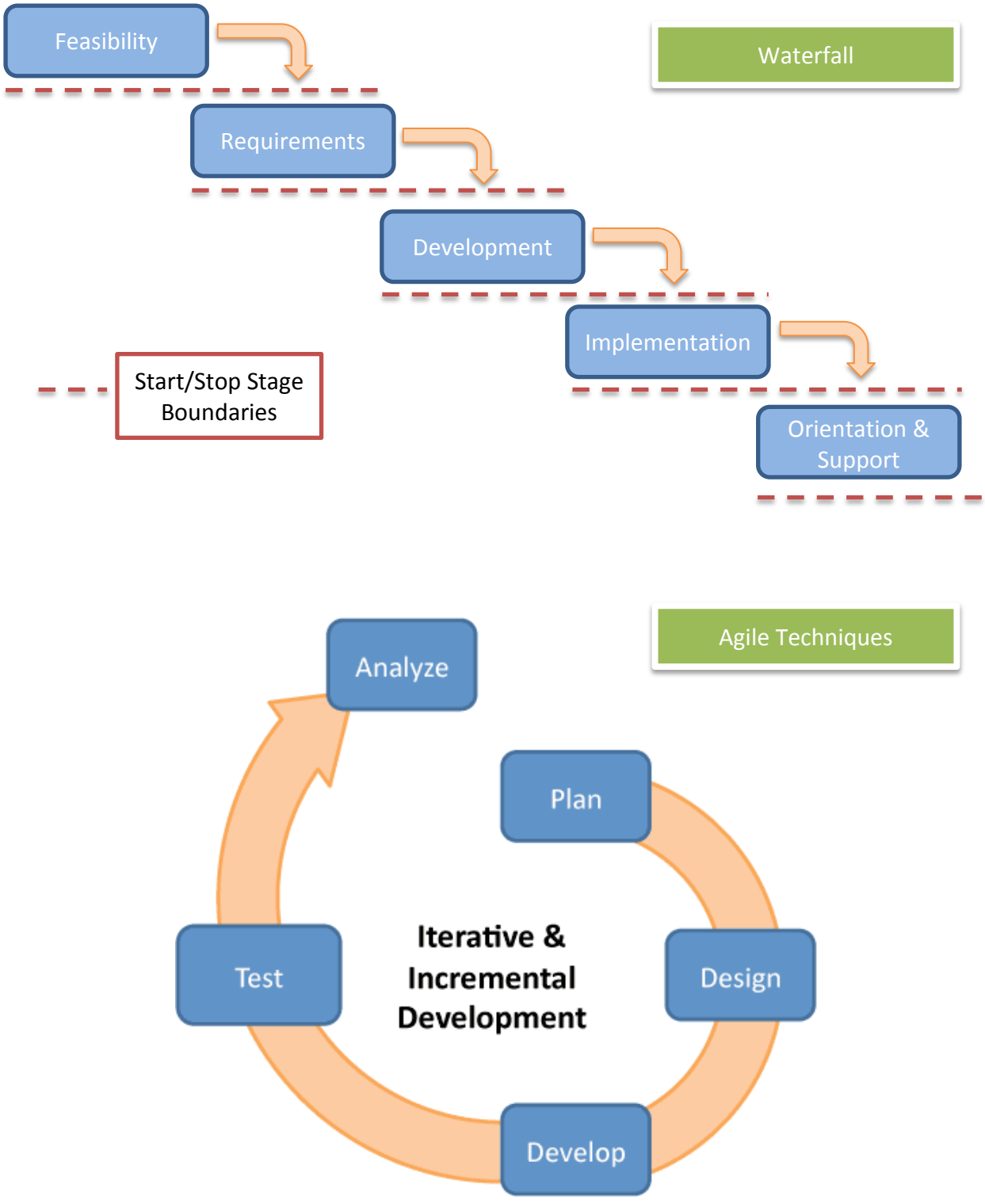


Figure 1.3.0 – Waterfall vs. Agile Project Management Methodology (in a software development scenario).

Agile Techniques also differ from traditional Project Management techniques such as PRINCE2™ and PMBOK® in the fact that they are not plan driven, they are instead value driven (see figure 1.3.1 below).

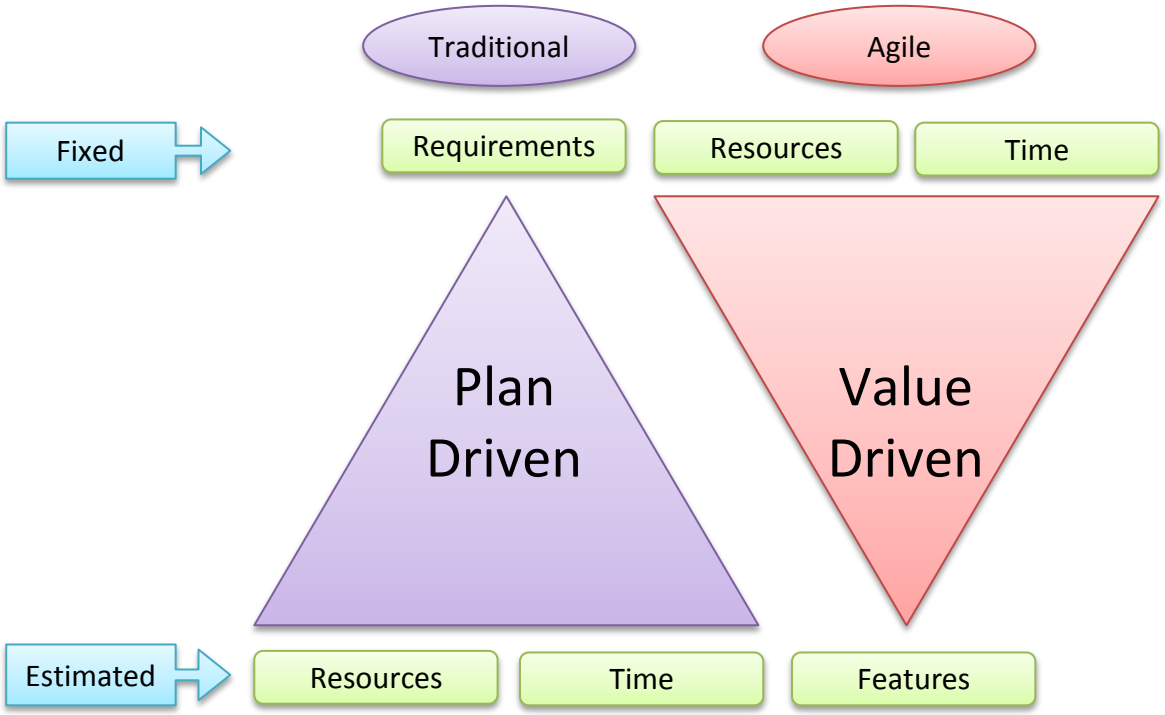


Figure 1.3.1 – Traditional Project Management vs. Agile Project Management
Adapted from Carroll (2012)

Whereas traditional Project Management methods start off with a fixed requirement, from which estimates of resources and time needed are made an Agile technique starts off with the resources and time available and then an estimate of what can be achieved is made and worked towards.

Traditional approaches to project management can be said to be 'command and control' styles of management where the project manager allocates tasks and controls their outputs based on time or financial constraints, but it was seen that this did not necessarily make best use of the developers' specific skill sets, nor did it achieve the best quality or most creative end product (Carroll, 2012). So at the 2001 *'Snowbird (Utah)'* conference developers' representatives defined the Agile approach in the Agile Manifesto (see figure 1.3.2 overleaf). There are then twelve principles which underline the Agile Manifesto, as can be seen in figure 1.3.3 (also overleaf).

The Agile Manifesto

We are uncovering better ways of developing software by doing it and helping others do it. Through this work we have come to value:

Individuals and interactions over process and tools

Working software over comprehensive documentation

Customer collaboration over contract negotiation

Responding to change over following a plan

That is, while there is value in the items on the right, we value the items on the left more.

Figure 1.3.2 – Adapted from Carroll (2012)

Customer Satisfaction:	By the early and the continuing delivery of useful software.
Changing Requirements:	Welcome changing requirements, even late in the development process.
Frequent Delivery:	Of working software, from every couple of weeks, to every couple of months.
Measure of Progress:	Delivery of working software is the principle measurement of progress.
Sustainable Development:	So the sponsors, developers and users can maintain a constant pace indefinitely.
Close Cooperation:	Business people and developers much work together daily throughout the project.
Motivated Individuals:	By giving them the support they need and trusting them to get the job done.
Face-to-Face Conversation:	The most efficient and effective method of conveying information in a development team.
Technical Excellence:	Through continuous attention to technical excellence and good design.
Simplicity:	By keeping things simple the amount of work that has to be done is minimized.
Self-organising Teams:	The best architectures, requirements and designs emerge from self-organising teams.
Regular Adaptation:	The team reflects on how to become more efficient and adjusts its behaviour accordingly.

Figure 1.3.3 – The Twelve Principles of The Agile Manifesto
Adapted from Carroll (2012)

Question 2

The management of BAA are delighted with your overview, and have commissioned you as overall project manager for the computerised Baggage Handling System for the new Heathrow Terminal T6.

*Select one of the three Project Management methodologies above for the project. Explain to BAA Management, why you have chosen this methodology for the project, and the **impact** (both **advantages** and **disadvantages**) of choosing this methodology will be for BAA.*

Introduction

For the purpose of managing the project for the computerised Baggage Handling System for the new Heathrow Terminal T6, it is recommended that a PRINCE2™ project management approach be taken. Even though the project itself is one mainly based on software (for the new computerised Baggage Handling System) the end requirements are fixed and so a more traditional project management method is more suited than an Agile technique. Furthermore due to the predicted size of this project, with numerous stakeholders working on it (sub-contracted or directly employed suppliers, end users [BA], and the customer organisation [BAA]) a more structured methodology in the form of PRINCE2™ is best suited to this project. The project in itself will be expected to take considerable time from conception, initiation through creation to completion and signing off, so whilst PRINCE2™ is potentially bureaucratic and labour intensive, with specific reference to the paperwork documentation entailed in it, this time can be absorbed easily into the total time to be spent on the project, making the paperwork only a small percentage of the projects time overhead. The specific impact in the form of advantages and disadvantages of using a PRINCE2™ methodology for this project are as follows;

Advantages

Initially PRINCE2™ is in the public domain and readily available, it is applicable to small and large projects and is very readily used in the UK. PRINCE2™ can be tailored very easily to the specific requirements of the project; but it is very important that this be done to ensure success.

As Charvat (2003) states, PRINCE2™ Focuses on results in terms of time, cost, quality, functionality (scope) and has a strong focus on the business case and the projects results

deliver. It integrates change management, controlling the changing environment and PRINCE2™ uses management by objectives and management by exceptions approaches.

Furthermore, PRINCE2™ has the advantages of;

- Establishment of effective project governance structures
- Revision of business benefits realisation throughout the project life cycle
- Managing in stages, which ensures we can only "bite off what we can chew"
- Extensive use of controls for project initiation, planning, delivery management and closing
- Product based planning
- Project assurance function

(OGC, 2009)

Disadvantages

However, with PRINCE2™ there is no proprietary software, it is purely a methodology so for the creation of the Baggage Handling System at T6 in order to manage the project via software, external sourcing is required (such as MS Project, SCRUM etc.). PRINCE2™ is not agile and therefore not an Agile methodology. As seen before Agile methodologies are often said to be more suited to software development projects, where groups work in self-organised teams, often utilising individual's skillsets more effectively, proving for greater innovation, and these human factors, or 'soft issues' are not within the scope of the PRINCE2™ methodology. These soft issues are very much needed for successful projects, so to this end will need to be catered for elsewhere within the project's life cycle (Charvat, 2003).

PRINCE2™ can be bureaucratic if its checklists and paperwork are not tailored to suit the needs of the specific project in hand, this can lead to high costs of labour if project members are spending more time than necessary on paperwork and in turn lowering of morale within the project team. PRINCE2™ can also be too rigid if not tailored to suit the requirements of the specific project, as previously mentioned. At the end of the day, PRINCE2™ is a method and not a cure for any project as many people think (Charvat, 2003).

Question 3

For your chosen Project Management methodology, select one technique which you have studied during the delivery of this module, and apply that technique to the computerised Baggage Handling System for the new Heathrow Terminal T6, assuming that the new terminal will have the same infrastructure and technical requirements of T5.

Organisational Structure

"The purpose of the [PRINCE2™] Organisational theme is to define and establish the project's structure of accountability and responsibility." (OGC, 2009. p.31).

In this piece the organisational structure technique will be discussed and applied to the computerised Baggage Handling System for the new Heathrow Terminal T6, based on the assumption that it is to have the same technical requirements of T5.

The project management structure used in PRINCE2™ can be seen in figure 3.0 below.

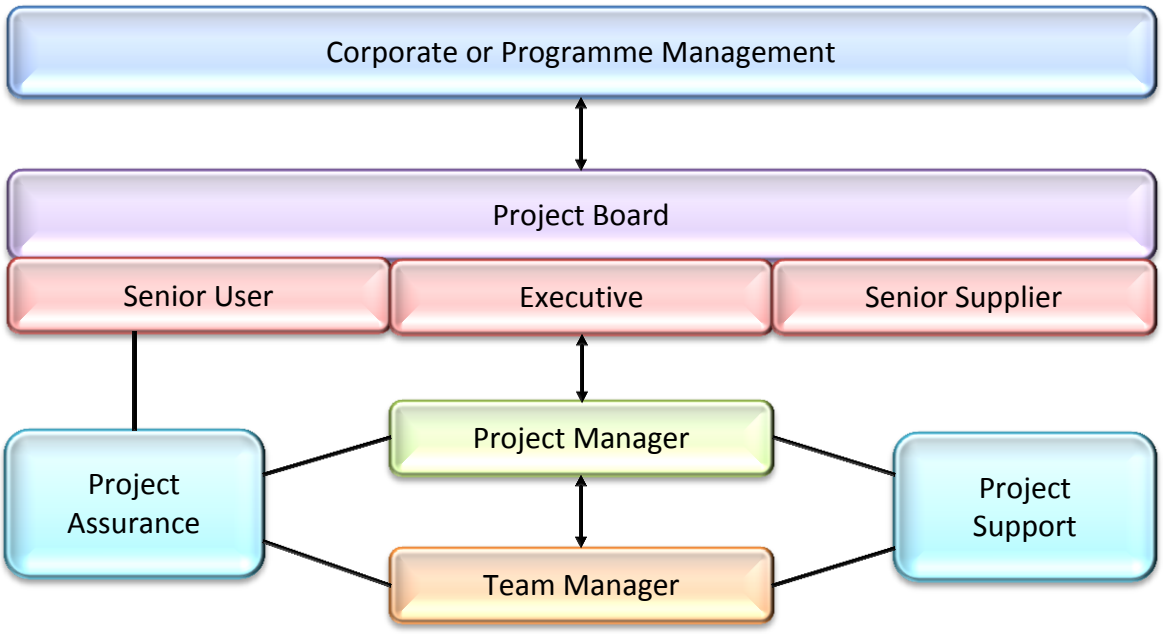


Figure 3.0 – PRINCE2™ Project Management Structure
Adapted from OGC (2009)

And details of the three project interests represented on the board as can be seen in figure 3.1 (overleaf).

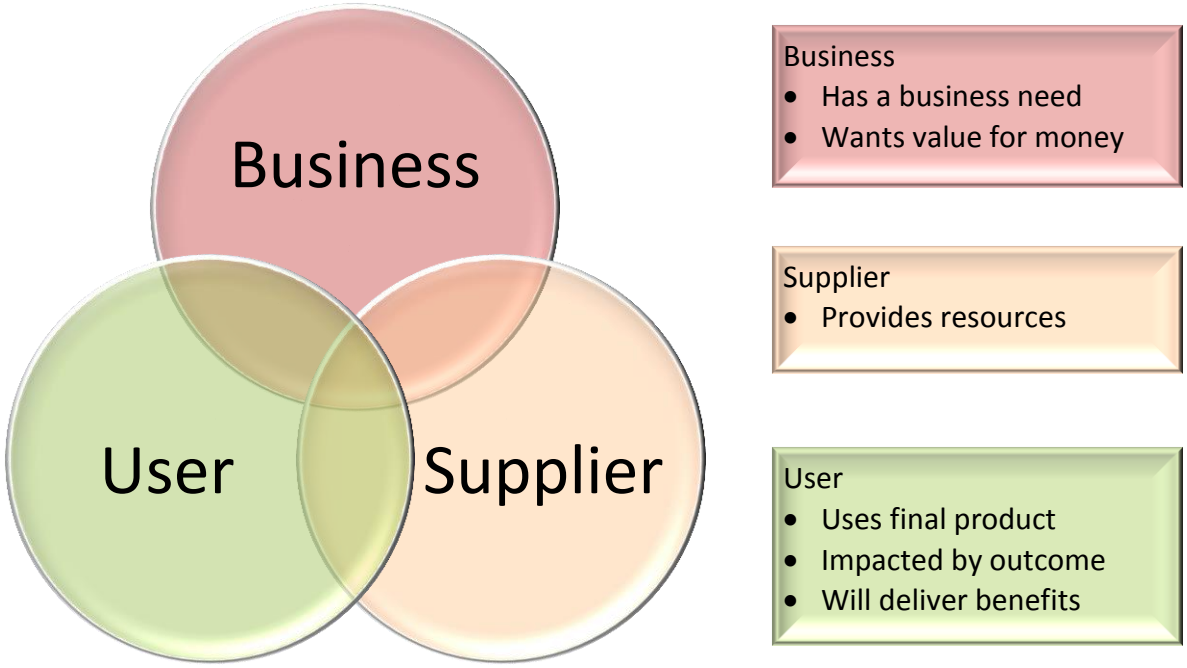


Figure 3.1 – PRINCE2™ Project Board Structure
Adapted from OGC (2009)

In the case of Heathrow T6's Baggage Handling System project, the project board would look like this;

Project Board

- Executive (Customer)
  - Senior representative of BAA (British Airports Authority)
- Senior User(s)
  - Representative of BA (British Airways)
  - Representative of staff that will use systems
  - Representative of union (GMB)
- Senior Supplier(s)
  - Representative of sub-contractors
  - Representative of builders
  - Representative of architects
  - Representative of interiors suppliers
  - Representative of in-house software developers

- Representatives of external software developers (sub-contracted)
- Representative of hardware manufacturers/resellers

The executive of this project is one person, who is ultimately responsible for the success of the project. They will oversee the development of the Business Case, monitor progress against it, ensure the organisational structure of the project is sound and coherent and formally close the project at its completion, completing any post-project reviews that are necessary.

The Senior User representative for BA is primarily there in the case of T6 to make sure that the products produced in the Baggage Handling System project, meet the requirements that BA have for them. In addition to this the Senior User representative for the staff is there to make sure the solution provided is actually fit for purpose in 'real-world' scenarios. Due to the issues that arose with the T5 project, such as the confusion where staff were not being able to log on to the computer system, or struggling to use the Resource Management System. Union representatives will also be needed to make sure that no contractual issues arise within the project, and that staff morale is kept up with continuous communication to ensure all staff are 'brought along' with the project as it progresses.

The Senior Suppliers in any project will provide the resources needed for its completion, they are naturally going to attempt to protect their margins whilst the project progresses, but ultimately need to make sure the proposals being made on them are realistic and achievable as ultimately they are accountable for the products delivered. The representatives for these components in the project will need to be able to commit to supplier resources used.

Further to this the post of Project Manager would be taken by the senior PRINCE2™ practitioner from within BAA. The project manager will report directly to the Project Board, and they are responsible for ensuring the project delivers the required products and outcomes, to the required quality within all tolerances set with respect to time and budget. The outcomes need to be able to meet the requirements set out in the Product Initiation Document (PID). The project manager will then have direct management oversight to all of

the teams required to make the project work and their relevant project Team Managers. The Team Managers will in the case of T6's Baggage Handling System, be made up of sub-contractors, builders, architects, interiors suppliers, in-house software developers, external software developers, hardware manufacturers/resellers, all of whom have representatives on the project board at the Senior Suppliers' representatives level.

The Project Board is responsible, via its Project Assurance role, for monitoring all aspects of the project's performance and products independently of the Project Manager (OGC, 2009). It is therefore the responsibility of the board to find out if things are going as they are being told they are going, if any problems or issues are being hidden and ultimately if the solution will be what is required. This Project Assurance in the case of T6 will need to be rigorous in order to avoid some of the issues that arose with T5 such as the issues with staff delays getting into the building and issues with "airside" security, making sure the Baggage Handling Systems operates well within the wider project of the construction of the new Terminal 6 as a whole. Also issues surrounding a lack of training for staff, leading them to not knowing where to go or what bags to get as identified in the BBC News article "What went wrong at Heathrow's T5" (BBC News, 2008).

The Project Support is the responsibility of the Project Manager, however in the case of T6, due to its size, it would be best practice to have a separate 'Librarian' responsible for this function, to administer and record all documentation, offer advice and guidance on the project's running and be a source of independent expertise on the tools and standards for running successful projects.

In conclusion, the organisational structure if created correctly will define and establish the project's structure of accountability and responsibility; this can be the difference between success or failure. As the OGC PRINCE2™ Manual (2009) states, "Every project needs effective direction, management, control and communication". And "maintaining these throughout the project's life, are essential elements of a project's success". (p.31)

Question 4

Part A

You are asked to reflect on what you have learned about organisational issues within this module, in order to identify what you can carry forward into your future studies.

Having previously managed numerous successful projects in my management career, I have always felt that I was a good project manager. In doing this module however I feel that I have learnt countless things that I can take forward to future projects.

Firstly and probably most importantly I have learnt there are various different ways in managing projects that can be more prescriptive to how I have managed projects in that past and will be able to more scientifically guarantee good, planned for results. It may well be that I have been lucky in the past, or this may not be the case, but in previous projects I have not looked at this, or challenged where the good results have come from, or why they have come about.

Previous projects I have either managed or been involved in have primarily been small and worked through, what I have now found out (through this module), more agile techniques, with lots of face to face meeting, and using action planning, with changing outcomes being acceptable. However, if I am going on to larger projects, where outcomes are more rigidly fixed, I now feel well armed to be able to use more traditional project management techniques, such as PRINCE2™ and PMBOK® tailored to suit the specific project's requirements.

Whilst I feel that my 'man-management' skills are sound, and indeed very good due to the success of previous projects, it is most likely for these reasons that I have had success in the past, not necessarily due to rigorous project management methodology. I now feel however that I have learnt a lot more about these more rigorous project management methodologies that I can take into future use in projects either as manager or team member.

On a more specific note I feel that the specific themes of the project management methodologies I have studied, such as lessons learnt, risk assessment, organisation structure, will be added ammunition in my armoury in future projects. As a highly organised and methodically minded person, I have always been good at things such as budgeting, and time management, and with an undergraduate degree in Management and ten years' experience in various managerial positions, my human resource management (interpersonal) skills have grown already, but there are always more things to learn and these specific themes have helped me to see other areas to also consider in project management.

Also looking at the cycles within projects, specifically initiation, planning, executing and closing, has helped me to see areas where I could in future add more prescriptive structure to future projects I am involved in; as value added skills.

Part B

You are asked to reflect on how you coped with the demands of this assignment and whether you would do things differently next time.

If I was to do this assignment again I don't think there is much, if anything, that I would do differently. As previously stated I am very methodical person, with many years' management experience and this is my third post-graduate qualification (PG Cert. Ed & PG Cert. Adult Literacy are my other two) so I planned and undertook this assignment in much the same way as I would plan a project. I thoroughly read and understood this project, before producing a calendar based assignment plan (see figure 4.0 overleaf) of when I would do all of the component parts, from research and reading to planning and drafting to write-up and finalising the assignment, including allowing myself a contingency period (or slippage) should anything go awry. I also used the same method simultaneously with my other three assignments for modules this semester, so mapped them all against what other work-load I had, to make sure all could be completed to my own high standards, set criteria and requirements and on time.

The only thing, I may consider and benefit from doing differently would be to use a Gantt chart or software such as MS Project to plan my assignments as projects.

Assignment Plan

	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
26th March	**P Man Class**	SP Q1	SP Q1	SP Q3a	**Strat Plan Class**	SP Q3b	**Tech Ent Class**	Tech Ent Meeting		**Web Tech Class**				
2nd April	SP Q2		SP Q2		SP Finalise		SP Contingency		SP Viva Questions		Web Tech Coursework		Web Tech Coursework	
9th April	TE Lit Review		TE Lit Review		TE Lit Review		TE Critical Analysis		TE Critical Analysis		Web Tech Coursework		Web Tech Coursework	
16th April	P Man Q1 (Prince II)		P Man Q1 (PMBOK)		P Man Q2		P Man Q3		P Man Q4		Web Tech Coursework		Web Tech Coursework	
23rd April	**P Man Class**	***Submit Stat Plan***	P Man Q1 (Agile)	SP Viva Revision	TE Application to Case Study		**Tech Ent Class**	Tech Ent Meeting		**Web Tech Class**	TE Application to Case Study		TE Conclusion	
30th April	**P Man Class**	SP Viva Revision	P Man Q1 (Agile)	SP Viva Revision	***Strat Plan Viva***		**Tech Ent Class**	Tech Ent Meeting		**Web Tech Class**	Web Tech Finalise		Web Tech Contingency	
7th May	TE Finalise		TE Contingency		TE Presentaion (Solo)		**Tech Ent Class**	Tech Ent Meeting		***Web Tech Pres'n***	P Man Finalise		P Man Contingency	
14th May	***Submit P Man***	***Submit Tech Ent***	TE Presentation (Group)		TE Presentation Contingency		***Tech Ent Pres'n***	***Submit Web Tech***						
21st May					Prince II Revision		Prince II Revision		Prince II Revision		Prince II Revision		Prince II Revision	
28th May	***Prince II Exam***													

Figure 4.0 – Assignment Plan (Semester1)

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