Management Methods for Complex Projects

MANAGEMENT METHODS FOR COMPLEX PROJECTS

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PREFACE

Project management is becoming a core competence for all of us. Across the globe, complex projects are emerging to meet the challenges posed by work uncertainty and disruption. Project-based businesses are required to readapt and implement changes while exploring management techniques to better achieve project outcomes. We believe it is not just about managing processes to ensure that the strategic goals of a business are delivered on time, within budget and specification. These days, project management is more about adopting and implementing the right methodology to strategically deliver the project to a successful outcome. Project management methodologies equip the project manager with a set of principles to ensure that they achieve optimum project performance. This freely available project management eBook is the start of your journey in the field of complex project management methodologies, introducing you to some of the core methods, processes and tools as recognised by the project management discipline. This eBook lays out methodologies such as XP, Agile, Scrum, Kanban, Six Sigma, PRINCE2, Waterfall, PRiSM, Soft Systems Methodology as well as introducing Project Design as a method so you can leverage the right project management approach. This eBook will be of value to students, practitioners, and businesses in Australia and overseas seeking professional development in the field of project management methodologies.

ACKNOWLEDGEMENT OF COUNTRY

James Cook University is committed to building strong and mutually beneficial partnerships that work towards closing the employment, health and education gap for Australian Aboriginal and Torres Strait Islander peoples. Our students come from many backgrounds, promoting a rich cultural and experiential diversity on campus. We acknowledge the Aboriginal and Torres Strait Islander peoples as the Traditional Custodians of the Australian lands and waters where our staff and students live, learn and work. We honour the unique cultural and spiritual relationship to the land, waters and seas of First Australian peoples and their continuing and rich contribution to James Cook University and Australian society. We also pay respect to ancestors and Elders past and present.

Kassandra Savage (JCU Alumni), 'Coming Together and Respecting Difference', acrylic on canvas, 2014, 90cm x 90cm.

ABOUT THE AUTHORS

Associate Professor Carmen Reaiche

From Hong Kong Disneyland to the Australian Public Service, a career in project management has taken JCU Associate Professor Carmen Reaiche across disciplines and around the globe. Carmen first began her journey into project management over 25 years ago while she was working for an international oil refinery in South Australia. With a Bachelor of Business and a Master of Business Administration, Carmen was originally hired as a systems analyst. She has held a number of management positions where she has designed, programmed and supervised the implementation of project management systems and strategic plans for businesses such as General Electric, Mobil, Centrelink and Business SA.

Dr Reaiche holds an MBA from the University of Adelaide and a PhD from the University of South Australia in the area of project management/soft systems self-organisation. Beyond her research successes (including more than fifty papers to date and others in preparation) Dr Reaiche has obtained several research grants and a wide range of cross-cultural teaching and supervisory experience (teaching and supervising research students in Australia, Venezuela, Singapore, Hong Kong, China, Singapore and Malaysia). Her present research interests include project management, innovative systems, digital transformation, cross-cultural leadership and social network aspects of business management models. Prior to joining the College of Business, Law and Governance at JCU she was the Associate Head (Teaching and Learning) in the Entrepreneurship, Commercialisation and Innovation Centre at the University of Adelaide.

Dr Samantha Papavasiliou

Samantha Papavasiliou holds her PhD in business innovation and digital transformation in government and public sector agencies. She also holds her Master of International Trade and Development, Master of Applied Project Management (Project Systems), Bachelor of Social Science (with Honours) and Bachelor of Psychological Sciences from the University of Adelaide. In addition, Samantha is currently undertaking her Diploma of Modern Greek.

Samantha is a Certified Associate in Project Management, and is currently a Project Manager and Data Analyst at the Australian Taxation Office. Her work focuses on service review and redesign and the implementation of significant and fundamental changes to support lodgement and payment operations. Previously, she was a data scientist with a focus on predictive analytics and real time analysis, used to support the lodgement program.

Samantha is also an Adjunct Senior Research Fellow at James Cook University in the College of Business, Law and Governance. In her role, she is supporting the development of the Graduate Certificate of Project Management. Additionally, her areas of research interests are in supporting digital transformation, understanding digital and complex project management and stakeholder management and engagement within these complex projects. Samantha also teaches project management at the postgraduate level, teaching classes ranging from fundamentals, to control methods and complex project management.

1.

PROJECT MANAGEMENT METHODOLOGIES: OVERVIEW AND DEFINITIONS

Learning Outcomes

- Assess what constitutes project management methodologies.
- Determine the importance of methodologies in project management.
- Contextualise the various types of methodologies.

What exactly are methodologies in project management?

Methodologies for project management are a series of distinct processes that have been developed to offer assistance to project managers and team members. There are various definitions of a project management methodology but they all have the same grounding: it is a set of procedures, concepts, and regulations for managing a project to a successful end.

We would like to define it as: *a collection of guiding principles and procedures for managing a project.*

Project management methodologies describe the way we operate and communicate while managing projects. Methodologies are collections of guiding ideas and procedures that can be used to plan, manage, and execute projects. These methods of managing work are focused entirely on determining the most effective way to begin, plan, and carry out tasks. However, as a project manager, remember that your choice of approach for managing projects will impact how work is prioritised and how it is carried out.

When it comes to project management, using these methodologies serves 2 purposes: first, it expedites the completion of the duties associated with the project, and second, it provides solutions for dealing with problems as they appear. In addressing these two main purposes, the methodologies also guide the team through the entire project and provide them with steps to take and goals to work towards, while aiming to achieve the successful completion of the project.

Why use a project management methodology?

One of the most important objectives of a methodology is to standardise, structure, and organise the many methods within which the work is performed. This helps us to integrate all initiatives in the same way while offering us the capacity to reproduce successful components of the project. Well-adopted methodologies will also help us to learn from our previous errors, and ultimately lead us into a process of continuous improvement. Therefore, using a methodology can be a very helpful tool for developing project efficiency.

- Using a methodology in project management offers the opportunity for project managers to:
- better organise project life cycles
- adopt specific tools that allow for a precise time and cost estimation
- oversee and mitigate risks associated with the project
- improve the cost-benefit analysis of the project resources in a pragmatic way
- develop the team capabilities and competencies

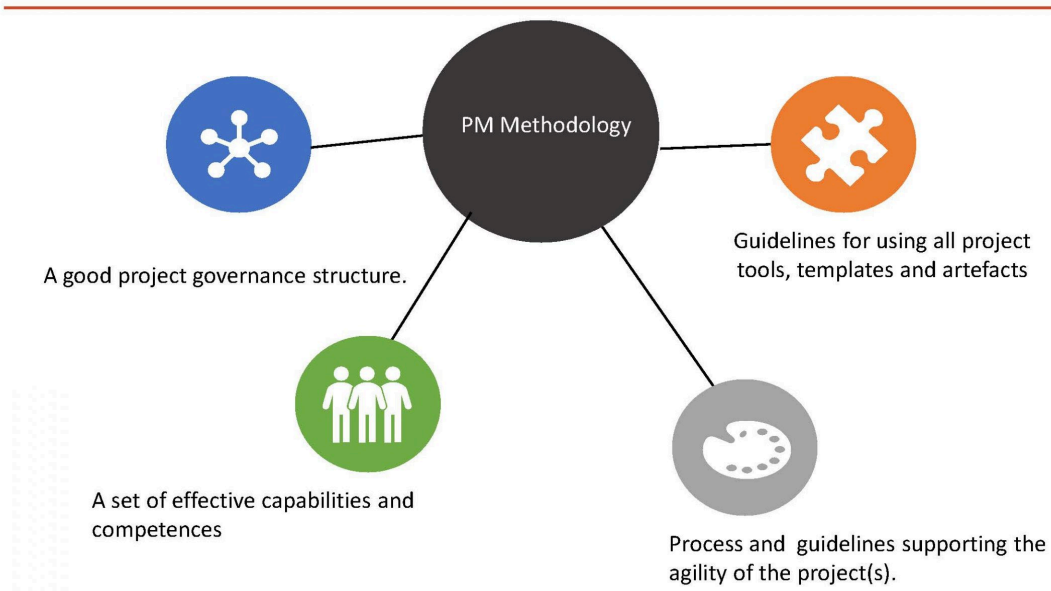
In terms of resources, a methodology may help to speed up the learning curve of the project team, as it provides a well-established framework and structure for executing the project. When it is used in complex projects, methodologies can be adjusted and updated to be more in line with the individual working style of the team members as well as the strategic direction of the organisation. If a project manager selects a methodology that is acceptable and standardised, it is quite possible to improve the work performance while simultaneously lowering the need for extra resources to accommodate any changes triggered by the complexities of the project.

There is no doubt that the project team benefits from having access to a set of standards – a methodology that assists them to initiate and manage specific projects to a successful closure. Consequently, an effective methodology should have clear and transparent definitions, guidelines, and sample processes for the numerous project management activities that must be accomplished to execute successful projects. A project management methodology establishes a common basis for all the organisation's activities. But most importantly, it establishes the grounds for success.

Project management methodologies offer the perfect planning framework to support the project throughout its life cycle. However, before attempting to implement a certain methodology style, it is necessary to have a thorough understanding of its benefits. Different project types require different management approaches. As a project manager, if you do not have a complete understanding of the benefits, you will be unable to maximise these effectively. Every methodology can be thought of as a reference framework, some of which are better suited to specific circumstances than others. Having the right methodology is critical. The right methodology adoption and implementation will assist project managers to lower or mitigate potential risks, prevent unnecessary duplication of tasks and activities, and eventually boost the overall outcome of the project. A methodology is a form of control mechanism that will enable and potentially ensure that the project closure is reached in the most efficient and effective way.

Organisations that use a methodology in a disciplined, well-managed, and consistent manner will gain a competitive advantage and achieve consistent project success.

Figure 1. Project management methodologies support areas, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0



Some of the benefits of having a project management methodology are shown above in Figure 1. But there are five significant advantages to using a project management methodology that we would like to focus on.

Advantage 1: Communication flow

When the project team members adhere to the same method, the communication channels and inclusive language become standardised. Because organisations often have many projects going at once, communication might become quite challenging. Having clear communication channels enables interaction and integration between various projects managers, allows team members and stakeholders to integrate their views, and helps sponsors to make decisions that are consistently sound and based on accessible information. Organisations should prioritise communication as an important goal and having a good methodology can support this goal.

Advantage 2: Control management

When project managers implement and run the right methodology, they are better equipped to monitor how the project and their management initiatives are progressing. A methodology provides a control system that enables project managers to monitor what is working well and what isn't and determine whether objectives are meeting their maximum potential.

Methodologies are control management systems. When applied correctly, these systems act as governance tools that can guarantee that everything that is going on in the project life cycle can be easily identified, and that governance decisions are transparent and on time. In fact, project governance and monitoring make up a considerable portion of the components that comprise a project management methodology. They pave the way for project activities to progress in a manner that is not only organised but also easy to comprehend and communicate.

Advantage 3: Global competence

Tendering can be a complex process and in the globalised arena in which we live today it can be especially challenging for businesses to win contractual projects. The tendering process asks an organisation to respond to a formal request for the supply of goods, services and/or projects. Adhering to a consistent process can help an organisation win external contracts. In project management, there are a lot of bids that demand the use of specific methodologies. For example, in the engineering field there are many bids that list PRINCE2 as a prerequisite. In the public sector, tendering will require the application of Agile tools. Even if your role as project manager doesn't require you to be involved in tendering or to participate in the bidding process of a contractual project, adopting a methodology (of any kind) is an essential component of good project management. It serves as a safeguard against everything that could possibly go wrong with projects and helps us to get back on track.

Advantage 4: Providing support during uncertain times

Methodologies can also assist project managers with overcoming the unknowns and uncertainties that are an inherent part of project management. With the support of procedures such as end-of-phase and gate reviews, it is possible for projects to transition from one stage to the next in a controlled and effective way. Without the proper control tools and methodology, many project managers would find it difficult to manage a project and access the information they need.

According to the literature (see, for example, Betts and Landsley 1995; Charvat 2003; Bondarenko 2017), the methodology capability of assisting with organising and structuring information is one of the main reasons why methodologies are important, particularly to project managers new to the trade. They provide supportive mechanisms that ensure that a project manager sticks to all the set protocols, follows the relevant processes, and obtains the required authorisations when required. These mechanisms are particularly useful and relevant in the face of uncertain events, ensuring that project managers do all the required tasks at the appropriate times. If project managers don't have access to a set structure or guide, or lack instructions that might assist them, then they may be forced to access more management support to avoid managing their projects to failure.

Advantage 5: Mapping processes to success

Project managers with any level of expertise may benefit from methodologies that display a degree of flexibility as they provide the required level of support to aid efficiency and facilitate the project manager's

work. Methodologies can be very regimented, which means that they do not provide a great deal of room for deviations. To some project managers, this could be a disadvantage as it can restrict creativity. However, a well-structured methodology is more likely to guarantee successful project completion. Distinctions between the steps of the process can enable users to divide tasks more quickly and minimise errors that would otherwise be impossible to manage. Because of a methodology's rigidity, project managers are required to pay meticulous attention to each stage, which in turn results in an automatically improved, controlled approach to the final outcome of the project.

Disadvantages

From a practitioner's perspective we could extend the list of advantages presented above; however, it is also important to highlight some of the disadvantages that are prevalent when a project management methodology is adopted. The advantages of having a methodology are very encouraging, but there is some research that suggests that methodologies provide no value to projects (see, for example, Bondarenko et al. 2018; Perrin 2018). The lack of value is seen in scenarios where project managers are experts in the field of the project, have extensive expertise in managing complex large projects, and have a clear understanding of the organisation's strategy. Methodologies have been proven to be effective in situations where they replace and/or complement project managers who lack the necessary expertise and skills, and this has generated a misconception that it is the only value they bring to projects. However, we should acknowledge that, when it comes to mid-level, experienced project managers who have an average amount of experience and accountability, there is also a point in the middle of managing a project, where the benefits of using a methodology begin to diminish.

Another disadvantage that we have seen is the disconnection that sometimes exists between what project managers believe to be of value for the project and what the organisation believes to be beneficial on a strategic level. Therefore, it is critical to establish a good communication system between all stakeholders and have everyone on the same level of understanding when implementing a methodology.

Methods aren't flawless, but they do offer a lot of benefits to the individual project manager as well as the organisation. There are many different routes that can be taken to successfully implement a methodology and complete a project. The best and most popular approaches, strategies, and frameworks are always evolving so we cannot suggest a single example for you to adopt. Behind any successfully completed project is a plethora of different strategies, methodologies, and procedures. In fact, you will most likely have the opportunity to make use of more than one of them during your project management career.

In this book, we will discuss some of the key methodologies, as well as specific components of these methodologies, that you may apply in practice in order to successfully deliver projects to completion. Table 1 lists some of these key project management methodologies and provides a brief explanation of the techniques that will be covered in the next modules.

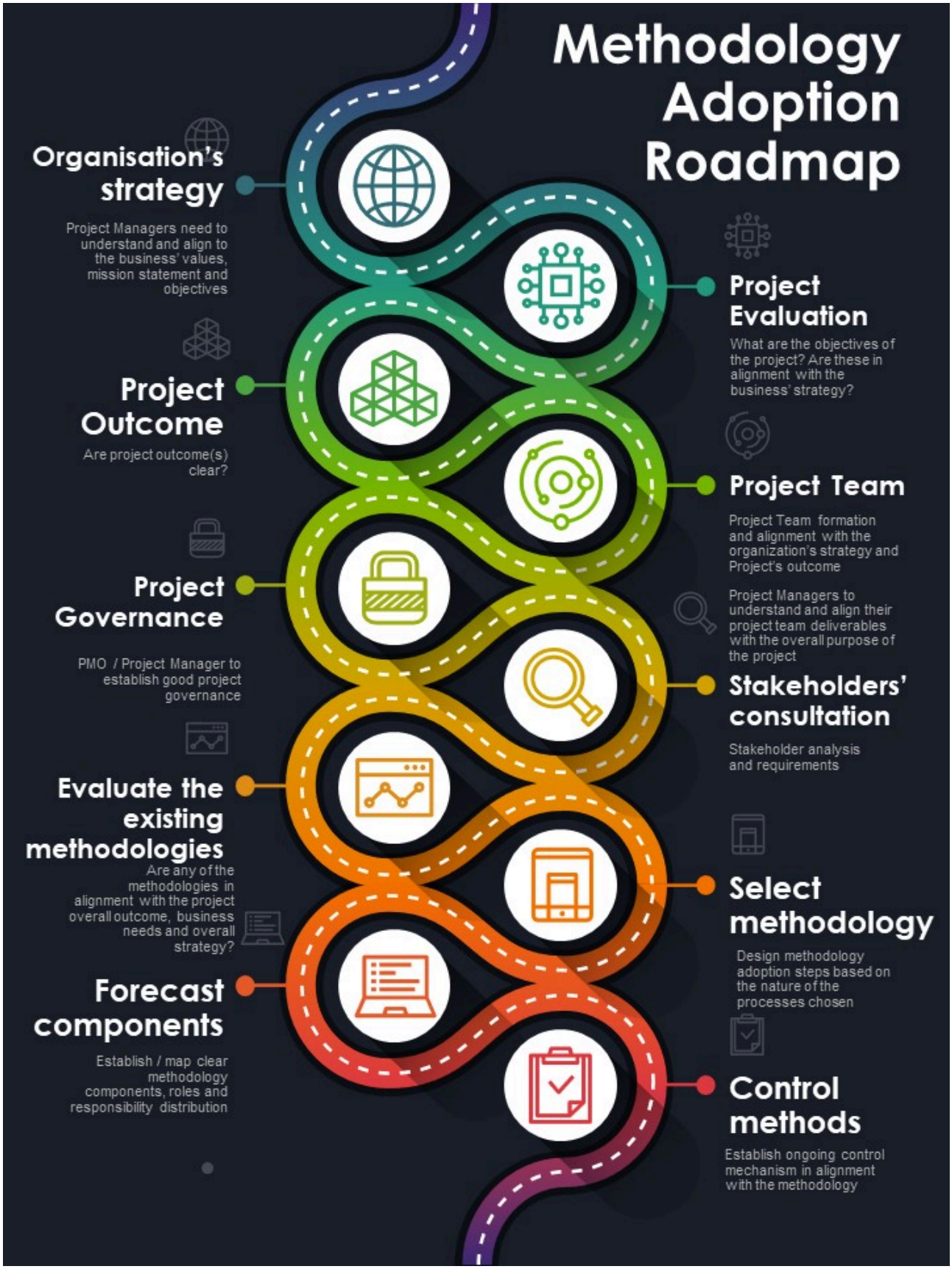
Table 1. Project management methodologies groups, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0

The uncertainty methodologies
Event Chain Methodology (ECM): analysing uncertainty models and optimising schedules
Extreme Project Management (XPM): managing stakeholders and eliminating uncertainty via efficient collaboration
The process-based methodologies
PRINCE2: 7 principles, 7 themes, 7 processes
Lean Project Management: maximum efficiency, minimum waste
Six Sigma: improvement by eliminating defects/bugs
Lean Six Sigma: no waste + zero defects
The traditional, sequential methodologies
Waterfall: do task A first, then task B, then task C
Critical Path Method: string dependent tasks together from start to finish
Critical Chain Project Management: reserve resources for the most critical tasks
The agile family
Scrum: sprints, clearing out roadblocks
Kanban: tasks made visual in lanes
Scrumban
Extreme Programming: short work sprints, frequent iterations, constant collaboration
Adaptive Project Framework: using Requirements Breakdown Structure (RBS) to define project goals, stakeholders can change scope at each sprint
Other methodologies
PRiSM: managing projects the eco-friendly way
Benefits Realisation: delivering the benefits the customer expects
Soft systems methodology
A system approach integrating all parts of the project situation to problem-solve with a holistic approach.

In sum, the various methodologies, strategies, and frameworks available to project managers are also useful to others. Figure 2 below shows a few guidelines for adopting a new methodology, but keep in mind that there is no one-size-fits-all framework. As discussed earlier, the whole team working on the project will benefit from these as they will need a tool to help them gain a solid grasp of the project objectives and maximise the project's and organisation's resources. The right methodology will help the team achieve these. Irrespective of the methodology option you select, the processes embedded under each methodology will ensure that the rest of the project requirements and procedures are carried out without a glitch. Keep

in mind that there is no such thing as a standard organisation strategy, typical project or team members – each of these are unique to the environment in which they and the project operates and resides. Therefore, each methodology must be understood and applied accordingly. Keep in mind that it is also possible that you will not find success using a methodology or an approach that has been successful for someone else. Because of this, we highly recommend that you try multiple methodologies and forecast in which way you might use these effectively for each of your unique projects.

Figure 2. A project management methodology roadmap adoption, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0



Test your knowledge

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https://jcu.pressbooks.pub/pmmethods/?p=5#h5p-2

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https://jcu.pressbooks.pub/pmmethods/?p=5#h5p-3

Key Takeaways

- As a project manager, aim to establish a productive culture for project management which will enable you and your team to employ a project management methodology in an efficient manner.
- Enhance the abilities of your project team members and provide them with a comprehensive understanding as well as a stable basis so that they may effectively manage their projects.
- A methodology should facilitate the clarification of goals and the scope of the project by integrating the organisation's strategy and best practices of all project management group processes.

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2.

THE UNCERTAINTY METHODOLOGIES

Learning Outcomes

- Assess how Extreme Project Management differentiates from traditional methods.
- Conceptually map how to implement Extreme Project Management.
- Contextualise the principles of Event Chain Methodology.
- Differentiate Extreme Project Management and the Event Chain Methodology.

Overview

Extreme Project Management (XPM) and Event Chain Methodology (ECM) are both considered uncertainty methodologies. Both approaches are aligned to projects that are complex, defined by speed, ambiguity, and fast changing needs, and therefore also characterised by rapid change. This is where the term 'uncertainty' emerges, as these project management methodologies are about managing the unknown. Let's review what types of projects are characterised under each of them and what comprises each methodology.

Extreme Project Management

Extreme refers to a result that must be accomplished in a very short time. XPM, also known as eXtreme, is a method for managing projects that are chaotic and done just-in-time in a responsive format. The nature of the project is messy and uncertain. Therefore, the need for speed, time management, and creativity in planning is paramount. The degree of predictability that surrounds an extreme project is far lower than that of a traditional project, which is one of the primary distinctions between the two types of projects. Extreme projects are carried out in tumultuous environments that feature a great deal of change and uncertainty, such as, for example the COVID-19 pandemic. The requirements of an extreme project are subject to constant change throughout the entire project life cycle, accommodating both internal and external factors. These factors change the objective(s) of the project and can include moves made by competitors, the introduction of new technology, shifts in customer needs, changes in regulatory requirements, response to environmental natural disasters, response to a pandemic, and general shifts in economic and political conditions (for example, the war between Russia and Ukraine).

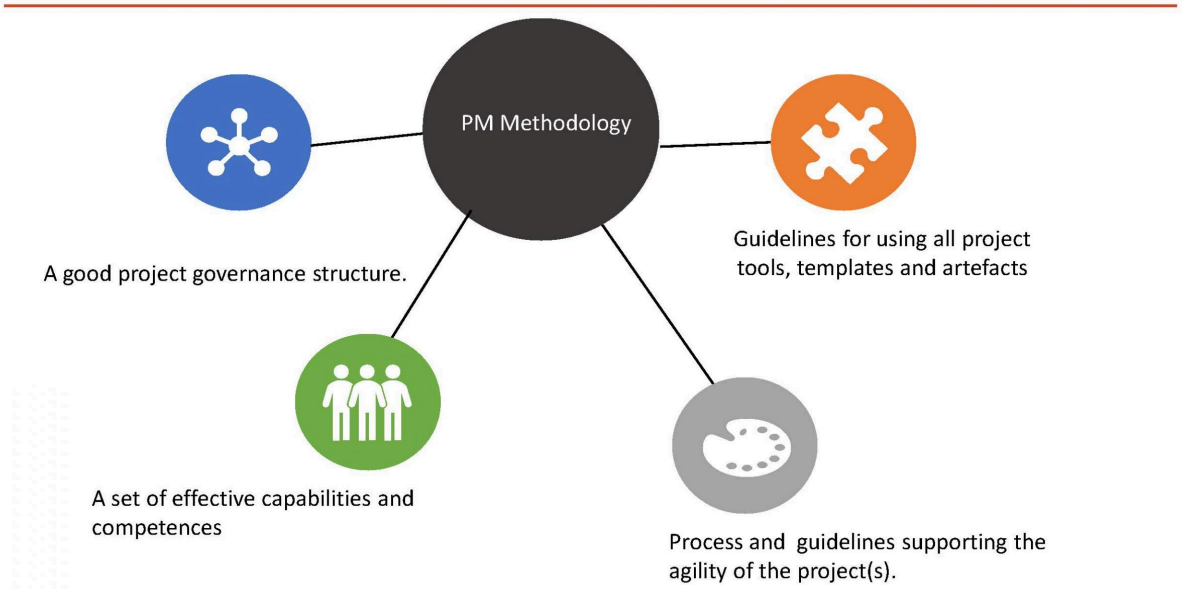
Extreme projects evolve at a quick pace despite always having a task that needs revising, a technology that needs updating, or a competitive strategy needing to be redesigned in response to a new environmental

demand. In most cases, these types of projects include deadlines and timetables that appear to be difficult to adhere to. Therefore, the most common response is to design a very detailed planning phase. Under this detailed planning phase, the tendency for most project managers is to give themselves enough time to methodically prepare each task of the process; however, by the time the task is completed, it is likely to be no longer relevant. The challenge or opportunity that it sought to solve will have taken a new shape – one that may not be easily planned and could, therefore, potentially trigger project failure. This is one of the main reasons why XPM is an increasingly important concept in today's society, which is characterised by globalisation, a rising digital economy, and Industry 4.0 – all of which are generating new environments in which businesses must learn to operate and readapt (Hoyer et al. 2020). In order to keep up with these new demands and apply XPM, project managers must focus their complete attention on developing new approaches that are responsive, flexible and adaptable to the ongoing changing conditions of today's business environment.

As changes occur due to the dynamic nature of market conditions and customers' ongoing evolving needs, the types of changes impacting the project's management processes are marked by frequent shifts (for example, cyclical scope creep scenarios). This in turn generates a very unpredictable working environment. In such circumstances, it will be impossible to create a comprehensive project plan or project strategy in advance. Such scenarios call for an adaptable management approach. XPM is one such method of managing projects which are immense in uncertainties and ongoing changes. Hence why XPM is also known as 'the flexible project model'.

Unlike traditional project management methods, XPM enables you and your stakeholders to maintain project control and produce asset management value in the face of uncertainty. According to DeCarlo (2004:34), 'Extreme project management is the art and science of facilitating and managing the flow of thoughts, emotions, and interactions in a way that produces valued outcomes under turbulent and complex conditions: those that feature high speed, high change, high uncertainty, and high stress'. Figure 3 is graphical representation of the key difference between traditional and XPM.

Figure 3. Examples of XPM vs traditional project management methods, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0



Since we have established that XPM is not a plan-driven approach, but rather an adaptable and self-correcting project method, it is necessary for us to understand the differences between a traditional versus an extreme management approach as listed in Table 2.

Table 2. XPM vs traditional management, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0

XPM	**Traditional Management**
Adaptive cyclical management systems	Plan and organisation design
Self-organised management	Top-down management
Manages the unknown and ongoing changes	Predictable management processes
Result-driven: outputs achieving the right self-organised result	Process-driven: outputs achieving planned inputs
Oriented by management	Oriented by leadership
KPIs: efficiency- and effectiveness-focused	KPIs: efficiency-focused

From a project management methodology viewpoint, there are some other differences shown in Table 3 below.

Table 3. XPM vs traditional project management, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0

XPM	Traditional Project Management
Methods target future outcomes: forecasting	Past oriented: lessons learned
Leading schedule and project execution	Managing schedule and project execution
Manages internal and external problems around project's world current exposure	Targets changing internal and external problems around project's world current exposure
Equal distribution of roles and responsibilities	Centralises project control and responsibilities

XPM offers benefits in 3 key areas:

1. It enables project managers to manage the unexpected during uncertain times.
2. It focuses on securing and sustaining stakeholders' commitment to the project's objectives and strengthens their trust in the project and the way in which project managers operate.
3. It is a complete, realistic plan based on a just-in-time schedule of events developed by project managers who are ongoing ambassadors of change management.

XPM process: a brief overview

As described above, XPM is an incremental and iterative approach to project management and development. This is the notion of gradual planning and scheduling recommended for project management. In XPM, the development of the schedule will occur in cycles of approximately 3 to 6 weeks. At each iteration, stakeholders will be presented with a fully functional report that includes roles and responsibilities, activities changed and the revised risk management plan for the reported iteration. Doug DeCarlo (2004), the founder of XPM, identified 4 phases: INitiate, SPeculate, Incubate, and REview (INSPIRE). Each iteration of development will increase the clarity of succeeding iterations.

XPM is initiated by gathering and integrating a willing and prepared team. Once formed, the team will follow these steps, which are closely aligned with the standard of the project life cycle, as a process guideline:

1. **Project design:** keep the concept of XPM in mind, for example, by anticipating change, recognising that the timeline may vary, and having a degree of allowance for errors.
2. **Address key questions:** What needs to be done? Who and why? How long will it take? Can we get the desired result? More importantly, is it worthwhile?
3. **Timeframe management is critical**: tasks must be arranged in cycles lasting no longer than a few weeks.
4. **Responsibility matrix:** establish a daily communications responsibility matrix.

5. **Engagement:** frequently engage with clients, gain clarification and consensus about their needs and communicate these to the project team.
6. **Review sessions:** when the project looks to be drifting, schedule review sessions and rearrange project tasks accordingly.
7. **Project celebration upon conclusion:** As per phase 4 of the project life cycle, close the project and celebrate.

Now remember, XPM can only be achieved with extreme self-management. Every team member must have a strong sense of responsibility and proactivity, and the team should foster an atmosphere of openness, encouragement, and trust: good project governance. In addition, we advise adopting XPM only when circumstances are highly unexpected, unknowable, and subject to constant change. Use this method only for specific projects for which it is impossible to develop a formal plan outlining the project's scope, time, and cost limitations in phase 1 and 2 of the project life cycle. For XPM to be effective, the project manager, as well as each member of the project team, needs to have a radical mindset and working behaviour that allows them to embrace a high degree of uncertainty.

Event Chain Methodology

ECM is a network analysis technique which addresses event variations and aims to control these variations by managing the relationships between events. ECM focuses on the relationships (event chains: predecessors and dependencies) that impact project timelines and highlight risks. Therefore, we can define ECM as a scheduling network analysis method that allows us to model and visualise risk events. Figure 4 provides an overview of the ECM process. The ECM is also defined as an extension of the classic Monte Carlo simulations and project risk assessment (Agarwal and Virine 2017). The ECM emerged as a recommendation from the Project Management Institute to use a variety of approaches for risk analysis, including estimated cost value, sensitivity analysis, and the Monte Carlo analysis. Hence, ECM is recognised as an extension of these approaches as they form the basis for the application of the ECM.

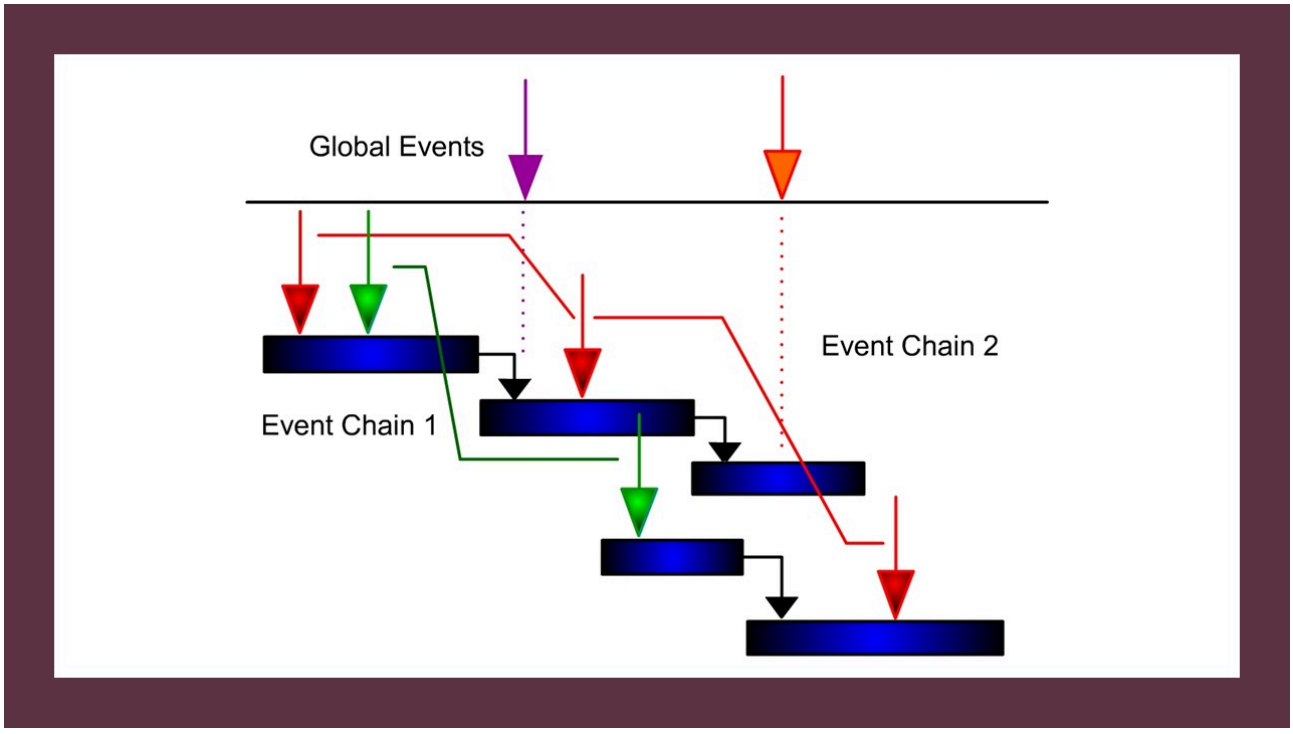
The ECM is based on 6 main principles:

1. ***Timing of risk and state of activity.*** As discussed earlier, most real-world project activities are not uniform or continuous, and they are influenced by events that alter their states and potentially impact the project activities while in progress, changing the finishing time or delaying it. These external events occur randomly and can be triggered by, for example, changes in supplies, materials, or labour, that can affect the length of one or more activities. Events can be categorised as positive or negative, and can completely transform an activity from the start to the end, as well as vice versa (referring to mitigation efforts, if facing risk).
2. ***Event chains***. An external event might result in subsequent events, forming event chains. Event chains have a substantial effect on project progress. Event chains are developed when one risk event (a trigger) generates another risk event, which typically results in a cascade of effects and major

repercussions across the project. A single event might have many effects on distinct project activities or resources, resulting in a 'burst' effect. An example of a trigger event could be a delay in the supply chain of materials, which will result in various activities being delayed.

3. ***The Monte Carlos simulation.*** This simulation is applied to quantify the accumulated effects of the events. It uses the probability that risks will eventuate and looks at their impacts as input data. This computerised, mathematical approach provides a probability curve for project planning.
4. ***Event chain diagrams.*** These diagrams highlight the link between external events and tasks, their effects, and how they mutually influence one another. Event chain diagrams are derived from Gantt charts with certain changes. An example is presented in Figure 4. On a Gantt chart, the chains are represented by arrows that correspond to a specific activity or time period.
5. ***Critical event chain.*** This enables visualisation of those events that are likely to impact the project the most. By anticipating their degree of impact, it is feasible to minimise or mitigate these. However, to be able to achieve this, the project manager must examine the connections between the primary project parameters, such as project time duration, cost and events.
6. ***Performance measurement with event chain.*** Using real performance data ensures the use of up-to-date information and the recalculation of event probabilities and moments of events. It is therefore essential for project managers to monitor live progress of an activity. This guarantees that the most recent data is used for the Monte Carlo analysis.

Figure 4. Event chain diagram by Kenmckinley at English Wikipedia, via Wikimedia Commons is available under Public Domain



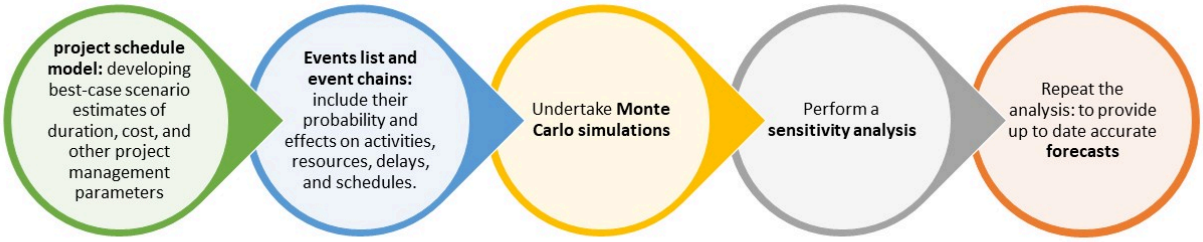
An event chain approach facilitates the description and analysis of complicated scheduling problems, such as event correlations and resource levelling. According to Virine and Trumper (2019), the algorithms

designed to address these issues are known as ECM phenomena. They are founded on fundamental event chain methodology ideas, and we will highlight a few of these next:

1. **Repeated activity**: certain external factors promote the recurrence of previously accomplished activities.
2. **Event chains and risk mitigation**: when an event happens over the course of a project, it may require a mitigation strategy, which is a detailed plan process that is only executed for certain risk events. Multiple events may use the same mitigating plans.
3. **Resource allocation based on occurrences**: the ECM also results in the reallocation of resources from one activity to another.

A brief guide to the key steps for project scheduling and analysis which have been discussed earlier in the integrated six principles of ECM are summarised in Figure 5.

Figure 5. Steps for project scheduling and analysis using ECM, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0



Suggested Reading

The white paper titled, 'Event Chain Methodology in detail', by Virine and Trumper (2019) presents an extended explanation of each of the steps discussed above. Please click on the link below [PDF].

In sum, ECM is a strategy for uncertainty modelling and schedule network analysis that focuses on finding and controlling events and event chains that have an impact on project timelines. It is a great methodology if it is applied correctly and if the project manager has a good understanding of the quantitative skills underpinning this approach. From a pragmatic perspective, ECM generates quantifiable evidence that helps to minimise our cognitive biases. ECM also has other great advantages:

- It incorporates ongoing actual information about the project performance into the original project plan.
- It simplifies the process of determining risks and uncertainties in project schedules, focusing on enhancing the capacity to conduct reality checks and visualise various events.
- It performs a more precise quantitative analysis.

Using the original schedule baseline as a starting point, the ECM technique enhances the current methodologies with new information on risk occurrences and their repercussions and by incorporating useful historical data.

Both ECM and XPM are related to the Agile system, which we will review in later modules. Yet, both approaches target different needs. When deciding which is the right project management method for your

project, there are many things to consider. However, to conclude this section, consider these final two guiding principles:

- Use ECM for projects that require a chain of events and risk analysis. ECM will be the best fit as it is used to simplify the process of defining risks and uncertainties in our project schedules.

- Use XPM for projects that require ongoing scope changes. XPM functions well in development contexts, where project needs are in continual flux. It is an incremental and iterative strategy of development and management. It is beneficial when the project's scope, timeline, and budget cannot be determined in advance.

Test your knowledge

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://jcu.pressbooks.pub/pmmethods/?p=82#h5p-4

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://jcu.pressbooks.pub/pmmethods/?p=82#h5p-5

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://jcu.pressbooks.pub/pmmethods/?p=82#h5p-6

Key Takeaways

- XPM serves as the foundation for innovation and creative thinking in project managers.
- Extreme projects move very quickly and allow teams to operate in shorter durations due to the fact that objectives are always shifting and technology is growing rapidly. As a result, the team is better able to grasp and appreciate one another's ideas and efforts.
- For XPM to have a quick impact and outcome, all team members must be able to communicate well and have a thorough comprehension of the project environment.
- ECM helps to mitigate the impact of motivational and cognitive biases in cost, time estimation and scheduling.
- ECM is a statistical, quantitative approach.

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3.

THE PROCESS-BASED METHODOLOGIES

Learning Outcomes

- Contextualise key benefits of process-based project management methodologies.
- Exhibit the 7 principles, 7 themes, 7 processes of the PRINCE2 method.
- Articulate the key benefits of Lean Project Management.
- Conceptually map differences and similarities between the Six Sigma and Lean Six Sigma approaches.

Overview

Process-based project management methodologies follow a systematic process which incorporates creation, management, and improvements. The process aims to align the objectives of the project to those of the organisation, project team, stakeholders, and clients (Goodman 2006). Within this process, all tasks, activities, and objectives must contribute to the outcomes of the project and business strategies. The primary aim is to achieve a common goal, based on collaboration between project team members, stakeholders, and the clients.

Process-based project management ensures that the project team understands the current state, potential improvements, and optimal end-state. This method allows organisations to understand the different requirements of the project to meet the overarching outcomes, and how to best manage the individual processes, tasks, and activities within the project. As per research by Myles and Coats (1995), through process-based project management, organisations are better able to:

- understand the varying client demands, needs and expectations, including how they change over time and in response to environmental factors
- support the response to the identified client expectations
- develop skills and capabilities in the project management domain
- manage their project from end-to-end
- integrate their various projects, programs, and portfolios
- identify and manage the different success and benefit indicators
- link the project outcomes to the organisational goals and objectives.

Within process-based project management, there are 6 commonly identified stages (Myles and Coats 1995), as outlined in Figure 6.

Figure 6. Common phases of process-based project management, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0

Stage 1: Define the process. Processes need to be clearly identified, precisely documented and shared with the project teams to ensure that they are properly followed and understood. This includes using tools, documentation, stakeholder consultations, agreements, guides for asset management and process diagrams/flow charts. The process should also define the responsibilities and roles of the different team members, including operational needs, reporting requirements and performance expectations.

Stage 2: Identify indicators. Evaluation is a crucial step in the process, including developing, collecting, and monitoring data outlining the performance of the process and team. This ensures that future improvements can be implemented around efficiency, quality, duration, and scheduling. These indicators need to be quantifiable, using comparative data, relevant references, and other supporting data for analysis.

Stage 3: Measure process performance. The current performance of processes needs to be measured to ensure the achievement of objectives and outcomes. This also enables a team to make decisions that support efficiency, evolve over time, and solve complex issues.

Stage 4: Adjust objectives. Check compliance of the process to ensure it is stable and adequate. If it is not, determine how to best improve the processes moving forward.

Stage 5: Improvements. Ongoing improvements and changes will occur to organisational culture, mission and vision statements, and objectives. Therefore, success measurement needs to be considered for all changes.

Stage 6: Implement selected improvements. For improvements as outlined in the previous step, organisational training may be required, as well as ongoing support for team members, and regular monitoring and continuous improvement of processes.

Advantages and disadvantages of process-based project management

There are numerous advantages of applying process-based project management, including improved processes, increased value-adding activities, reduced costs, and strategic alignment to the organisation.

Organisations which follow process-based project management processes see improvements to flexibility, interpersonal relationships between employees, and the reach of the outcomes. Within a process-based methodology, every staff member knows their roles and responsibilities, and they collaborate to achieve the end-state. As a result, use of resources is improved, decreasing overall costs.

Most process-based methods encourage continuous improvements, whereby inefficiencies are identified and removed. Therefore, applying this method to a project and/or an organisation, there is a move away from a hierarchical system. Instead, roles and responsibilities are dictated based on organisational need. Change management also becomes a key area within the planning process. Organisational training needs to be ongoing, ensuring that every employee is part of the process.

Process-based project management methodologies include the following:

1. PRINCE2: the main focus is 7 principles, 7 themes, 7 processes.
2. Lean Project Management: the main focus is maximum efficiency, minimum waste.
3. Six Sigma: the main focus is improvement by eliminating defects/bugs.
4. Lean Six Sigma: the main focus is no waste + zero defects.

Let's explore each of these approaches.

PRINCE2: 7 principles, 7 themes, 7 processes

PRINCE2 is a process-based method for effective project management, and it stands for **PR**ojects **IN** **C**ontrolled **E**nvironments. The focus of this method is on breaking a project into smaller components and stages (Axelos 2015; PRINCE2 2022). This is achieved by outlining clear roles and responsibilities and applying the project life cycle using the 7 processes outlined in PRINCE2. Projects should also be broken into logical steps, following a framework that is organised and controlled prior to starting the work, and is maintained and followed throughout the execution (Axelos 2015; PRINCE2 2022). PRINCE2 is based on the following 7 key principles, 7 themes and 7 processes.

Seven Principles

The PRINCE2 method is based on the application of 7 principles (also referred to as guidelines) which are not to be altered. PRINCE2 principles are defined as a mindset. If the project does not meet these principles, it should not be managed through PRINCE2 methodology (Lawton 2015; Bennett 2017; Axelos 2018). These principles, as outlined in Lawton (2015), are:

1. Continued business justification. The business case is vital and updated throughout the project to ensure that the project remains viable. Through the business case, if the project ceases to provide value, the project can be terminated early.

2. Learning from experience. Maintain a lesson learned register for each project and ensure that the project team uses the logs throughout the project (and reviews registers from previous and concurrent projects).
3. Defined roles and responsibilities. Within PRINCE2 there are 4 levels of structure in terms of roles and responsibilities, including program or corporate management, project board, project manager and project management team level. Within the project management team, all the primary stakeholders need to be represented (business, user, and suppliers), along with the roles and responsibilities of the team members themselves.
4. Managing through stages. Projects are controlled and planned in stages, moving stage by stage. This includes updating documentation as required, including the business case, risk register, project plan and next steps work breakdown structure.
5. Management by exception. Projects using the PRINCE2 method have defined tolerances (6 aspects, defined below) for each objective, outlining levels of authority. If these tolerances are exceeded, the decision needs to be extended to a higher delegation.
6. Focus on products/outcomes. The project's primary focus should be the definition and delivery of products or outcomes, including their quality requirements.
7. Tailored to suit project environment. PRINCE2 should be tailored to meet the project needs (for example, environment, size, complexity, importance, scheduling, budget, and risk). Within PRINCE2 the first activity is tailoring within the initiation phase (which is then reviewed at each stage).

Not every principle or component outlined with PRINCE2 is applicable to every project. The components are used to guide the project manager and project team on whether these processes are relevant to the project specifics. A primary element of PRINCE2 is tailoring the needs to a particular project (Lawton 2015).

Six aspects

The 6 aspects are also referred to as the project tolerances and/or performance goals. These are used to quantify the project tolerances or performance expectations that need to be followed and considered as part of the decision-making process (Lawton 2015; Bennett 2017; Axelos 2018). Additionally, these can be referred to as Key Performance Indicators (KPIs). Table 4 outlines the various aspects within PRINCE2.

Table 4. Six aspects of PRINCE2 (Lawton 2015; Axelos 2018)

Tolerance type	Maintained in the project level
Scope	Project plan, scope of work and scope statement
Timescale	Project plan, project schedule
Risk	Risk registers and risk management plan
Quality	Project quality management plan and KPIs
Benefits	Business case and KPIs
Cost	Project plan, budget

Project benefits can be difficult to determine, especially when related to ensuring that the project remains within cost/budget.

Seven Themes

Themes are the activities which need to be completed at the start of a project. They are used to set a baseline and monitor a project throughout its life cycle. Themes are used to guide how the project should be managed (Lawton 2015; Bennett 2017; Axelos 2018). Therefore, themes are tailored to suit the project needs, depending on the environment, scale, budget, and schedule (Lawton 2015). These are outlined in Table 5.

Table 5. Seven themes of PRINCE2 (Lawton 2015; Axelos 2018)

Theme	**Management Products**
1. Business Case	Business Case Benefits management approach Co-design Governance Stakeholder engagement
2. Organisation	Communication Management Advisory group Project team Co-design groups
3. Quality	Quality register Quality management plan Key performance indicators Feedback Review current and plan future practices and pathways Identify best practice Stakeholder engagement
4. Plans	Following steps: • project product/outcome description • work breakdown structure • scope statement • flow diagrams These fit within the: • project plan • work breakdown structure • team plan
5. Risk	Risk register Risk management Risk mitigation

6. Change	Issue register Change management approach Stakeholder engagement Change approval
7. Progress	Baseline to measure project success Reviews of the issue register, quality register, risk register Reporting: checkpoint, highlight report, end stage report, end project report

Seven Processes

The 7 processes are used to manage a project and identify the roles and responsibilities of the project team members (Lawton 2015; Bennett 2017; Axelos 2018).

1. Project start up. This step determines whether the project is viable and includes the project brief, business case and stepping out a plan of the key milestones. Within this step, the project manager is appointed along with the project team (Axelos 2018). This step should provide a clear scope of work to be completed and support the creation of baselines and performance expectations.
2. Project initiation. This step requires the definition of the project aspects (for example, scope, cost, schedule, risk, quality, and benefits) (Axelos 2018).
3. Direct a project. This step requires ensuring that the decision-makers are accountable throughout (Axelos 2018).
4. Control a stage. This step involves controlling how each individual stage will be managed, following the work breakdown structure, the project plan and schedule. The project manager is responsible for assigning work, and ensuring it is completed and meets the requirements (Axelos 2018). These should be reviewed; ongoing checks need to be in place to verify and compare the progress of the project work against the project plan and consider the issues and risks that have occurred and their resulting impact.
5. Manage product/outcome delivery. This step involves managing the delivery of the project product or outcomes, controlling the work being completed and the performance of the project team (Axelos 2018). For the project manager and project team there should be formal requirements for their performance, their acceptance criteria, steps for execution and delivery of the project work.
6. Manage stage boundary. This step is broken into 2 parts. First, the project manager is responsible for

providing updates to the project boards outlining the performance, updates or changes to documentation, and creating next steps plans (as required) (Axelos 2018). Second, information provided by the project manager to the project board is used to provide understanding of what they are approving or how work is progressing (Axelos 2018). Overall, this step is used to document transitioning or moving between stages.

7. Project closure. This step involves the formal closure of the project, transitioning to business as usual and evaluation of the benefits/performance (Axelos 2018).

In sum, PRINCE2 is a commonly used process-based project management methodology. PRINCE2 project management methodology offers significant benefits to project managers, project sponsors, and project team members within an organisation and for the organisation more broadly. These benefits link back to the fact that the project is more controllable using resources and can manage the business and risks associated with the project more efficiently.

Lean project management: maximum efficiency, minimum waste

Lean project management is often referred to as less of a project management tool and more of a mindset for driving continuous improvement. The lean method is based on experiences within the Toyota Production System (TPS) and is often referred to as Toyota's Lean Method. It is based on applying lean manufacturing principles to managing projects (Womack et al. 1990; Womack and Jones 1996; Moujib 2007). The method focuses on reducing waste across all business processes, resulting in cost and lead-in time reductions and quality improvements.

As the basis of Lean management is continuous improvement, it fits within the broader Agile project management environment. This is due to its overarching flexibility and adaptability to change. The primary focus is delivering value to clients/customers and broader stakeholders.

Lean manufacturing: Toyota Production System

After the 1973 energy crisis, Toyota was the only organisation that managed to resist foreclosure. It did so by changing the way in which it worked to be more efficient and effective. Through implementing a cultural shift within their organisation and empowering its workforce, Toyota was able to undertake a continuous improvement process (Womack et al. 1990; Womack and Jones 1996; Moujib 2007). Encouraging its employees to identify inefficiencies and overcome them through implementing new ways of working (Womack et al. 1990; Womack and Jones 1996; Moujib 2007) led to improvements in its product quality and client satisfaction, and a reduction in cost and lead-times.

This process was a breakthrough for mass production, which started to move towards lean production – from a push system to a pull system.

Lean benefits

The Lean methodology uses less of everything, compared to most other mass production processes (Womack et al. 1990:256). Benefits outlined in the literature include:

- reduced lead-in times
- lower inventory and storage costs (due to less over-production)
- decreased overall costs
- productivity and efficiency improvements
- increased quality
- improved client satisfaction.

3Ms of Lean

'To be lean is to provide what is needed, when it is needed, with the minimum number of materials, equipment, labor, and space', (Moujib 2007). Within Lean manufacturing, there are three types of waste: Muda, Muri, and Mura (commonly referred to as the 3Ms) (Moujib 2007).

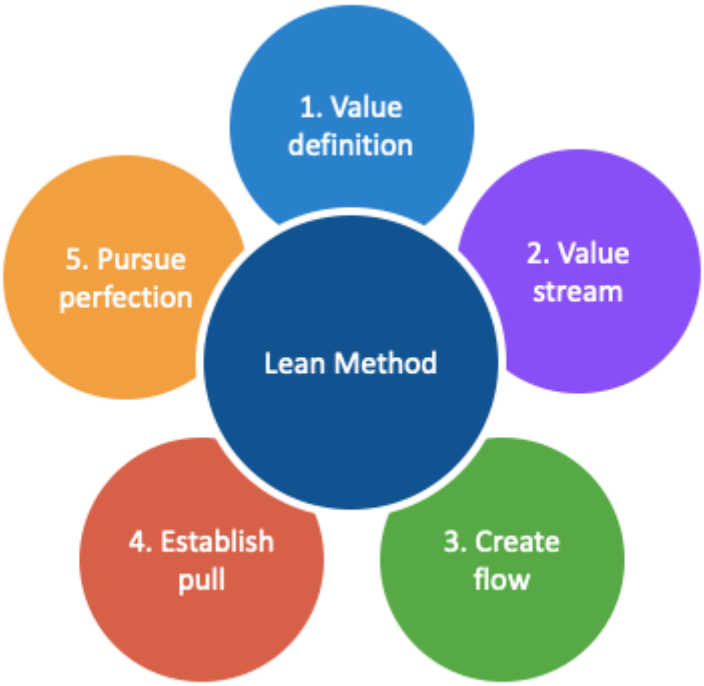
- Muda includes activities which consume resources without providing additional value.
- Muri includes overuse of equipment or employees.
- Mura outlines operational 'unevenness', based on decreased long-term efficiency and productivity.

The overarching aim of Lean project management is to reduce the 3Ms within the project process.

Principles of Lean Thinking

A primary element of Lean project management is the application of 5 principles (outlined in Figure 7). The first step is to understand how to apply the 5 principles to your project (Womack et al. 1990; Womack and Jones 1996; Moujib 2007).

Figure 7. Five Lean Principles, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0



The 5 principles are:

1. Specify value in the eyes of the customer

Specifying value is the first lean principle. This principle requires defining the value of a product, service, or outcome (Womack et al. 1990; Womack and Jones 1996; Shook and Rother 1999; Morgan 2002; Moujib 2007). Value ensures that the outcome is provided to clients at the right time, based on the right price and to the requirements of the client (Womack and Jones 1996). Value should be outlined in the client's words. The challenge of Principle 1 is being able to focus on what the client is willing to pay and their overarching needs.

2. Identify the value stream for each product

Identifying the value stream is the second lean principle. The value stream can be defined as all the actions within the process that are required to bring about the outcome or product to the client (Womack et al. 1990; Womack and Jones 1996; Shook and Rother 1999; Morgan 2002; Moujib 2007). This includes all steps from design, planning, testing, and launching. The flow should also outline the different value-added and non-value-added processes (Morgan 2002).

The first step in applying Principle 2 is creating a value stream map. This should reflect the current state of how processing is occurring within the organisation, or the steps taken to reach an outcome (Morgan 2002). Once completed, this map needs to be analysed to identify where there is waste and how value can

be created. After this has been completed, the future-state map is documented, and it is the representation of how the process needs to operate to reduce waste.

Using these process maps, an improvement plan is generated. This plan will support the transformation from current to future state.

3. Make value flow by eliminating waste

Principle 3 involves the flow of value through the elimination of waste. After defining the value, identifying the value stream and considering the improvement plan, the next step is to create continuous flows (Womack et al 1990; Womack and Jones 1996; Shook and Rother 1999; Morgan 2002; Moujib 2007). This requires eliminating backflows, reworks, wasted work, interruptions, and scrap. The elimination process should involve removing stoppages throughout the process and ensuring that all value streams identified fall within 3 categories:

- *Value-Added Work:* essential to producing the outcome, product, or service. The aim is to maximise work that fits within this category, as the aim is to provide client value (Form, Fit, Function) (Morgan 2002).
- *Value-Enabling Work*: work that can be potentially eliminated in the future (based on identified improvements) but cannot be eliminated immediately. In the current state, this work is necessary (Morgan 2002). This incorporates different components, including technology, environment, culture, and others. The aim is to identify waste in this section and minimise work within this category.
- *Non-Value-Added Work:* work which can be eliminated quickly as it does not flow on to improvements in other areas (Morgan 2002). This section outlines the work that is not needed, defined as pure waste. The aim is to eliminate all work within this category.

In addition to the 3 categories of waste, all the waste ('pure' or 'necessary') identified can be classified within one of the following 7 types (Womack et al 1990; Womack and Jones 1996; Shook and Rother 1999; Morgan 2002; Moujib 2007):

- *Over production:* producing more than is necessary before it is required.
- *Waiting:* non-work time waiting for approval, supplies, parts, etc.
- *Transportation:* effort wasted on transportation of materials, parts, or finished goods into or out of storage or between processes.
- *Over processing:* undertaking more work than required (customer requirements) or double the work.
- *Inventory:* holding excess inventory of raw materials, parts in process or finished goods.
- *Motion:* wasted motion or actions to pick up or stack parts.
- *Defects:* reworks or repairs required due to inferior quality.

4. Let the customer pull the flow

Principle 4 is around letting the client pull the flow. This principle presents a challenge, specifically how to avoid delivering value prior to the client's customer request (Morgan 2002) and ensuring that the outcomes provided do not exceed the initial and agreed upon scope. By letting the client pull the flow, the implementation is based on the just-in-time system, whereby the client signals the need for the item or outcome triggering the next steps required.

5. Continuously improve in the pursuit of perfection

The fifth and final principle is the pursuit of perfection through continuous improvement. This requires a process of improvement built into the business as usual and within the culture (Morgan 2002). The pursuit is endless, and as a result all activities should be questioned as to the value they add. Perfection may never be achievable; however, the aim should be to get as close as possible.

In sum, Lean project management is a process-based project management methodology. This methodology is also referred to as a mindset around the improvements within an organisation. The focus is on improving efficiency, reducing waste, and increasing productivity. There are many benefits associated with the application of Lean methods, including better product outputs and quality and improving the overall organisational efficiency and allocation of resources. Lean methods encourage innovation and quality controls.

Six Sigma: improvement by eliminating defects/bugs

Six Sigma uses a set of techniques and tools for process improvement. The purpose of Six Sigma is to identify improvements to quality in manufacturing through detecting and removing causes of defects, aiming to minimise variability in outputs. To achieve this, Six Sigma uses statistical quality management methodologies (Harry 1988; De Feo and Barnard 2005; Gygi et al. 2005; Kwak and Anbari 2006). Each project follows a set methodology, based on specific value targets (for example, reduction in pollution, improvements to client satisfaction, decreased cost of production).

The term originates from statistical modelling within manufacturing processes, the maturity of which is described through a 'Sigma rating' which indicates yield or number of defect-free products (Harry 1988; De Feo and Barnard 2005; Gygi et al. 2005; Coryea et al. 2006; Kwak and Anbari 2006). In technical terms, it relates to how many standard deviations within the normal distribution the percentage of defect-free outcomes equates to.

Six Sigma: Motorola manufacturing

Six Sigma was developed by Motorola, who set Six Sigma as the goal for their manufacturing. The process was developed to promote quality outcomes within an organisation, with a focus on the elimination of defects (Harry 1998). The term was coined in 1985 by Bill Smith and trademarked by Motorola in 1987 (Harry 1998). It has also been defined as an attitude, whereby making outcomes defect-free should be the aim of all employees.

Six Sigma components

This method requires the following components (Harry 1988; Kwak and Anbari 2006):

- Continuous improvements are to be implemented as part of the process, in order to create a stable and predictable output. This stability is vital to business success.
- Characteristics within manufacturing and business processes need to be defined, measured, analysed, improved, and controlled.
- The entire organisation should be committed to achieving ongoing quality improvement – this is especially important for higher level leaders.

There are a number of features within Six Sigma which set it apart from similar methods:

- The focus is on achieving measurable financial returns.
- Leadership and support from management is vital.
- Verifiable data-driven decisions are required to remove guesswork.

The focus of Six Sigma is eliminating defects and reducing variation. The primary goal is to improve processes, so an organisation should determine the appropriate Sigma level for every one of their processes and aim to achieve these. It is important that management is clear on the areas for improvement and how they will be attained.

Methodologies

Six Sigma projects follow two project methodologies (De Feo and Barnard 2005), as follows.

- DMAIC

This is used for projects which aim to improve an existing business process. It follows 5 key phases (De Feo and Barnard 2005) (see Figure 8).

Figure 8. DMAIC 5 phases, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0

1. **Define** the system. Document and understand the needs of the client and what they require and use this data to develop the project scope and goals.
2. **Measure** the current process and use it as a baseline.
3. **Analyse** data and identify where possible the different causes and effects. Highlight the relationships between the different factors, then, once all factors have been considered, seek out the root cause of the defects.
4. **Improve** the current process, based on data analysis techniques and mapping future-state processes. It is recommended that organisations use pilot testing to understand the impact of proposed changes.
5. **Control** future-state processes by ensuring deviations from target are corrected before they cause defects. This requires implementing quality control systems (for example, statistical controls), and continuously monitoring the process. This entire process should be ongoing and repeated until desired quality levels are obtained.

- ## DMADV

This is used for projects which aim to create new outcomes, products, or process designs. The process is also referred to as Design For Six Sigma (DFSS). It follows 5 key phases (De Feo and Barnard 2005) (see Figure 9).

Figure 9. DMADV 5 phases, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0

1. **Define** or design project goals which meet the client requirements, and new or existing organisational strategies.
2. **Measure** and identify all the distinctive characteristics which are Critical to Quality, and can be used to measure the outputs, risks, and capabilities.
3. **Analyse** the proposed future state and develop proposals for potential alternatives that can support improvements.
4. **Design** an improved outcome, based on the analysis completed in the analyse step.

5. **Verify** the design using test runs or pilots, implement the process into business as usual and complete the handover.

Benefits to Six Sigma

Organisations can benefit from applying Six Sigma methodology to their business and projects in many ways (Harry 1988; De Feo and Barnard 2005; Gygi et al. 2005; Coryea et al. 2006; Kwak and Anbari 2006), including the following:

1. **Reduction in operational costs.** The application of Six Sigma can provide organisations with a future-state process map which highlights inefficiencies and reduces the exposure to risks, making the organisation more efficient and effective at delivering its outcomes.
2. **Improved efficiency or timeliness.** This methodology improves the efficiency of processes, encouraging timeliness in delivering products or services on time.
3. **Improved accuracy, controls, and policy compliance.** It helps to improve accuracy through reducing Defects-Per-Million-Opportunities (DPMO) across the process value stream. The DPMO is a probabilistic measure of error rate and takes into consideration actual and probable defects in every opportunity.
4. **Improved customer service.** Organisation corporate is significantly impacted by client interactions. By applying Six Sigma, organisations can better understand client experience, understand what is causing different experiences and minimise dissatisfaction.
5. **Improved cash flow.** The primary improvement gained by applying Six Sigma relates to improvements in sales, which results in cash flow improvement.
6. **Improved regulatory compliance.** There are 3 primary types of regulatory compliance: financial and audit, information technology, and legal. The Six Sigma project type will dictate which of these will be the focus and what kinds of defects or efficiencies can be identified.

In sum, Six Sigma is a process-based project management methodology. This method provides organisations and project managers with several tools which support the improvement of business processes and their capability. Like Lean, the purpose is to improve performance of team members including outputs, while decreasing variations in the process to achieving an outcome. This in turn leads to reduction in defects and supports improving profits, team morale and quality outcomes.

Lean Six Sigma: no waste + zero defects

Lean Six Sigma is defined as a collaborative team effort, based on improving overarching performance through the systematic removal of waste (George 2002). It is a combination of Lean project management and the Six Sigma method, which aims to eliminate 8 distinct types of waste (referred to as muda) (George et al. 2003). Therefore, the principles of Lean Six Sigma are aimed at improving both quality processes and efficiency.

Waste

Waste can be defined as anything other than the minimum required levels of materials, equipment, parts, space and employees which are essential to complete the product (Summers 2011). The several types of waste are outlined below (Skmot 2017):

- **Defects:** a product that is unfit for use, requires disposal or reworking. This costs money and time to address.
- **Over-production:** excess products or those made or purchased before they are required.
- **Waiting:** delays caused by waiting for material or equipment or conversely unused equipment.
- **Non-used talent**: wasting human potential and skills, where employees are not empowered to provide feedback or obtain training and skills improvement.
- **Transportation:** unnecessary or excess movement of people, tools, equipment, products or materials.
- **Inventory**: excess products and materials that go unprocessed. It could cause items to become unnecessary before the start of its life cycle usage, storage costs increase or damage could occur to the materials.
- **Motion:** unnecessary movement by people, whereby excessive motion wastes time and can cause injury.
- **Extra-processing:** doing more work than required to complete a task.

Three key elements of Lean Six Sigma

There are 3 primary elements that need to be understood and considered as part of the application of Lean Six Sigma (George 2002; Summers 2011):

- **Customers:** These need to be at the centre of everything that an organisation does and support the development of the outcome. Customers are primary stakeholders with a significant interest in obtaining products which are of the highest quality but the cheapest price.
- **Processes:** Business processes require a rework or evaluation, changing to an outside-in approach based on the value chain. Customers pay for products which are defect-free. Therefore, organisations using Lean Six Sigma focus primarily on high quality products and outputs.
- **Employees:** Clear business processes are required across all levels of the organisation. Transformation needs to be part of the organisational culture.

Within Lean Six Sigma, innovation stems from need. Need is driven from customer expectations and requirements. Organisations must constantly evolve and this includes developing innovative solutions, with the aim of pre-empting the market needs.

Lean Six Sigma principles

There 5 fundamental principles of Lean Six Sigma (George 2002; Summers 2011) (see Figure 10).

Figure 10. Lean Six Sigma principles, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0

1. **Customer focus.** Define what 'quality' and 'satisfaction' mean to customers and align business processes with the employees and skills required to achieve the goals.
2. **Define roadblocks to consistent quality.** Undertake an assessment of the organisational priorities which aim to meet customers' and stakeholders' expectations. The organisational problems and priorities need to be well defined, and this can be supported by qualitative and quantitative data.
3. **Eliminate inefficiencies.** Remove non-value added and value-added steps within business processes. Through applying Lean Six Sigma, organisations can eliminate waste, simplify processes and offerings, or automate where possible. The aim is to measure the outcomes and improve as needed.
4. **Communication and employee alignment.** Ongoing communication and training should be implemented across the organisation, establishing a cultural change of collective problem-solving. This cultural change should also be encouraged down from the leadership and managerial levels to the employees.
5. **Be flexible and adaptable.** Organisations, including their employees, need to be responsive to change. This should include changes to organisational structure and management strategies, to enable responsiveness to the market.

Benefits of Lean Six Sigma

The implementation of Lean Six Sigma methodology should influence the entire organisation's approach to delivering customer outcomes (George 2002; Summers 2011). There are a multitude of benefits that the application can provide, including the following:

1. **Talent and capability development.** Using Lean Six Sigma requires ongoing development of employees' capabilities. As a result, there is an enhanced focus on talent development and continuous learning built into the organisational culture.
2. **Quality delivery through efficient business processes.** Business processes are supported through data-driven decision-making and increased transparency. Quality comes from the client-centric focus which ensures that customer voices are heard and that future designs will meet the changing market.
3. **Scalable across sectors.** Lean Six Sigma can be applied broadly across industries, with successful application seen across retail, IT, healthcare, and other sectors.
4. **Basis for technology deployment.** Lean Six Sigma aims to drive continuous improvement. There are many scenarios where it has supported digital transformation efforts, alongside broader business transformation strategies.
5. **Enhancement of brand value.** Clients trust organisations that respond to their issues and challenges in a timely way. Lean Six Sigma encourages an organisational culture whereby people and processes are based on enhancing brand.

In sum, Lean Six Sigma is another process-based project management methodology. Organisations that use this methodology often identify improvements to their overall client experience and as a result improved client loyalty. These improvements are also evident across the organisation, with improvements to their internal efficiencies, processes and team members, along with increased profitability. Like Lean and Six Sigma, this process-based methodology aims to prevent defects in products or outcomes, reduce costs and remove waste wherever possible.

> There is no doubt that process-based project management methodologies are the most effective ways to enhance the management of any business projects as their overall focus is on attaining a high level of performance.

Test your knowledge

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://jcu.pressbooks.pub/pmmethods/?p=91#h5p-7

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https://jcu.pressbooks.pub/pmmethods/?p=91#h5p-9

Key Takeaways

- Process-based project management methodologies follow a systematic process which incorporates development, management, and improvements.
- The focus of the PRINCE method is on breaking a project into smaller components and stages.
- Lean project management is often referred to as less of a project management tool, and more of a mindset for driving continuous improvement.
- The purpose of Six Sigma is to identify improvements to quality in manufacturing through identifying and removing causes to defects and aims to minimise variability in outputs.

- Lean Six Sigma is defined as a collaborative team effort, based on improving overarching performance through the systematic removal of waste.

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4.

THE TRADITIONAL, SEQUENTIAL METHODOLOGIES

Learning Outcomes

- Determine the importance of traditional project management methodologies.
- Analyse the processes of Waterfall, Critical Path Method and Critical Chain Project Management
- Assess the benefits and disadvantages of adopting traditional project management methodologies

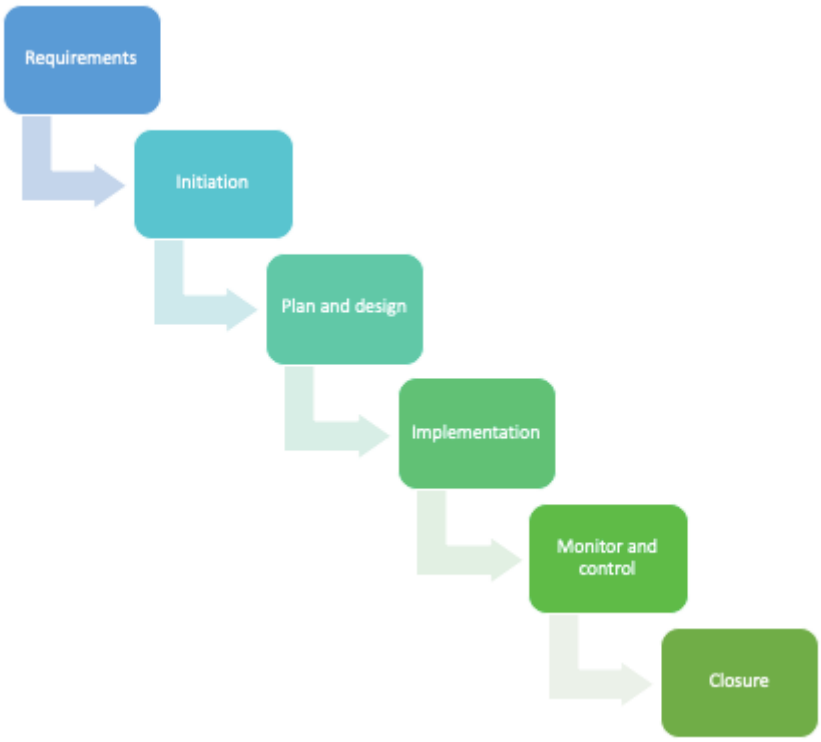
Overview

Traditional or sequential project management methodologies are run in a linear fashion, following 5 common phases: initiation, planning, execution, monitoring, and closure. This process requires upfront planning, documentation, and prioritisation (Salameh 2014; Jovanovic and Beric 2018). Using this approach requires defining the scope up front and setting the project requirements at the start.

Therefore, traditional project management requires the use of a project manager or a Project Management Office that holds central responsibility over the project and is accountable for achieving outcomes (Salameh 2014; Jovanovic and Beric 2018). Once the scope has been agreed upon, and the initiation phase begins, changes must be managed through the change management process.

As these traditional project management methods rely on proper planning and analysis in the initiation phase, it is front heavy for the planning. The following process of development and design is streamlined, allowing the project manager to focus on the key tasks within the project and the project team to manage the remainder with minimal guidance. There are several tools and techniques as outlined by the Project Management Institute (PMI), including the Project Management Body of Knowledge (PMI 2017). Figure 11 shows some of the phases a traditional and sequential project may go through.

Figure 11. Example of traditional and sequential project phases, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0



Benefits of traditional project management methodology

There are several benefits of using the traditional and sequential approach, following pre-planned steps. These include (Salameh 2014; Jovanovic and Beric 2018):

1. **Clear direction**. As everything is pre-planned, every project team member knows their roles and responsibilities, and follows the project requirements, allowing the project team to work efficiently and under minimum supervision.
2. **Control**. The Project Management Office holds most of the power and the changes are managed by the project manager. As a result, deviations from the project scope are unlikely.
3. **Sole source of accountability**. As the project manager holds the power, they are accountable for the project outcomes (either success or failure). As a result, they become the central accountability, and stakeholders know who to contact to make necessary updates.
4. **Proper documentation**. This is the foundation of traditional project management methodologies. The documents are used to standardise the processes and provide guidance and support for future projects.

There are several types of traditional and sequential project management methodologies which will be discussed within this module.

Waterfall: do task A first, then task B, then task C

The most common traditional approach to project management is the Waterfall method. The method is based on completing tasks and phases in a linear manner, whereby each stage must be completed before the following begins (Kerzner 2009; PMI 2017; Lester 2021). The Waterfall method breaks down the project into several phases and tasks that are to be performed sequentially.

Common phases within Waterfall project management

Dividing a project into phases manages the project team's focus, appropriately allocates resources, and aligns the project's life cycle with clients and stakeholders (Kerzner 2009; PMI 2017; Lester 2021). The common phases are outlined in Figure 12. The phases may differ from project to project; however, they commonly include:

Figure 12. Common project phases using the Waterfall method, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0

1. Initiation phase

The initiation phase involves defining the new project scope or new phase of an existing project. This phase requires completing documentation to create and authorise the project, including developing the project charter, assigning the project manager, and identifying stakeholders (Kerzner 2009; PMI 2017; Lester 2021). The project charter should outline the scope statement, initiation project budget value, and primary stakeholders. Once initiated, the project manager will proceed to the planning phase.

2. Planning

This stage involves establishing the project scope and objectives and defining how to meet objectives (Kerzner 2009; PMI 2017; Lester 2021). The primary project management plan document is created during this phase. It contains the following information:

- Scope statement. This outlines the work that will be completed as part of the project, establishes boundaries, and considers the assumptions and constraints. A scope statement should also include

what is not in scope.
- Deliverables. What will be produced, created, or developed as part of the project need to be listed.
- Success factors. The project success is defined, linked back to the budget and schedule required; however, additional factors around quality, stakeholder engagement, etc., should also be incorporated.
- Schedule/timeline. The project is broken into key tasks and activities (within a work breakdown structure). Timeframes are determined for key tasks, supporting the development of the timeline and deadlines for each project deliverable and the end-to-end project.
- Budget. This includes the estimated cost of each task and deliverable, which is collated to develop the overall project budget.
- Human resource plan. This documents the roles and responsibilities of the project team members, and the resource acquisition processes.
- Quality management plan. This is the development of quality requirements for each deliverable, including quality assurance and controlling processes.
- Risk management plan. This plan identifies the potential risks, analyses their likelihood and consequence, and analyses mitigation processes and documentation within a broader plan.
- Procurement management plan. This documents the process for acquisition and control of vendors outside the organisation.
- Change processes. This records the methods and documentation of the change request process of the project management plan.

A project management plan needs to be distributed to the project sponsor and key decision-makers, to ensure they endorse or approve the implementation or execution of the phase (Kerzner 2009; PMI 2017; Lester 2021). Once the execution phase begins, the change control process will need to be followed for any deviations from the plan for approval.

3. Execution/implementation

The execution/implementation phase is where the defined work from the planning phase is completed. In this phase, the project manager is responsible for work distribution, management, and assurance of the work underway (Kerzner 2009; PMI 2017; Lester 2021). The deliverables are undertaken and provided to the stakeholders for assessment. The project manager and team are responsible for:

- Project status updates: regular updates of the status are provided to key stakeholders. As part of these status updates the project manager monitors the timelines, ensures the budget remains on track and within the schedule. Quality assurance processes should be undertaken for each deliverable.
- Stakeholder communication and engagement: stakeholders need to be communicated with specific information and updates. This is as documented within the project management plan.

This phase is based on the steps and tasks as outlined within the project management plan, and all the steps should be working towards the project scope as outlined in initiation.

4. Monitoring and controlling

This phase requires monitoring and controlling the process, including tracking, reviewing, and regulating and responding to the different challenges as they arise (Kerzner 2009; PMI 2017; Lester 2021). The phase is completed concurrently with the execution phase.

Within this phase the project manager needs to measure the project execution outcomes in comparison with what was planned within the project management plan. This involves reviewing the budget, and ensuring the processes are on schedule.

Many project managers use the Earned Value Analysis process to support their monitoring and controlling phase (Kerzner 2009; PMI 2017; Lester 2021). This requires calculating the schedule and cost, including several variables:

- Planned Value (PV): budgeted amount for each task at a point of time.
- Earned Value (EV): actual completion amount for each task compared to task budget.
- Actual Cost (AC): actual cost for each task.
- Cost Variance (CV): value of the cost overrun or underrun (CV = EV – AC).
- Cost Performance Index (CPI): relative amount in which the project is over or under budget (CPI = EV / AC).
- Schedule Variance (SV): amount the project is behind or ahead of schedule (SV = EV – PV).
- Schedule Performance Index (SPI): relative amount the project is ahead or behind schedule (SPI = EV / PV).

Additional variables that can be analysed include:

- Budget at Completion (BAC)
- Estimate at Completion (EAC)
- Variance at Completion (VAC)
- Estimate to Complete (ETC)
- To Complete Performance Index (TCPI).

Earned value analysis provides a snapshot of the project's schedule and budget status at a point in time.

Where project monitoring shows changes from the project management plan, the change control process should be implemented.

5. Closure/maintenance

The closure phase is when the project is formally closed. This is where the project manager and team determine how the project was completed (for example, was it within budget, schedule, quality parameters), and perform all the necessary due diligence to close out contracts or tasks that remain unfinished. In some instances, this phase is referred to as handing over to business as usual (Kerzner 2009; PMI 2017; Lester 2021). Within this phase, there are several key components that need to be documented within a final closure report. These include:

- Formal closure: finalise contracts and agree that the project is completed.
- Funding/budget: confirm final project budget and release any leftover funding.
- Procurements: finalise vendor contracts and issue completion certificates.
- Final details: document the work performed, and other details that need to be recorded to support future projects and provide governance as to what was completed.
- Liabilities: clarify any warranties, insurance requirements or coverage, and bonds that either need to be established or maintained.
- Resource release: return or release project team members, and other resources and equipment.
- Lessons learned: document the lessons learned throughout the project to support future projects.

Benefits of Waterfall project management

There are several benefits to using Waterfall project management methods:

- Consistent and clear documentation: documentation is created at every stage and supports a better understanding of where errors or mistakes may be made. It also makes for an easily repeated process.
- Progress tracking is simple: using a Gantt chart (or similar) it is easy to track project progress.
- Team members manage their time effectively: due to the level of upfront planning and documentation, stakeholders can estimate how much time each task is likely to take.
- Simplicity: it is straightforward process that is logical and sequential in nature. Every team member is clear on what they need to be doing and when.
- Discipline: disciplined planning, scheduling, designing, and structuring is required for all projects. Waterfall requires phasing, milestones, and deadlines.
- Early adjustments: easy adjustments and alterations occur at the planning phase. However, it becomes difficult to make changes later in the project.

Cons of the Waterfall model

There are several cons or challenges that can arise from using Waterfall project management methods:

- Roadblocks drastically affect timelines: due to the linearity, when a task is delayed, the entire timeline

is altered.
- Linear progress makes backtracking difficult: it is difficult to go back to a completed phase.
- Quality assurance happens late in the project: the review stage in Waterfall occurs towards the end of the project, making it costly to fix defects.
- Rigidity: it lacks adaptability and responsiveness.
- Lack of user involvement: the level of client or end-user engagement is often low.

Therefore, where your project may require iteration or seeking out the best end-state, Waterfall may not be the most appropriate approach. Where a project is likely to change, requirements are unclear or testing is required throughout the project, Waterfall may not provide the best outcomes for a project.

In sum, Waterfall project management is a traditional and sequential form of project management, and the most common version within the industry according to the Project Management Body of Knowledge (PMI 2017). Waterfall requires project managers and teams to follow a linear process and sequence of activities and tasks, where they are unable to move to the next phase until the previous is completed. There are many diverse types of projects which will excel in this space, especially those which are easy to define from the start and do not require the flexibility of a cyclical approach.

Critical Path Method: string dependent tasks together from start to finish

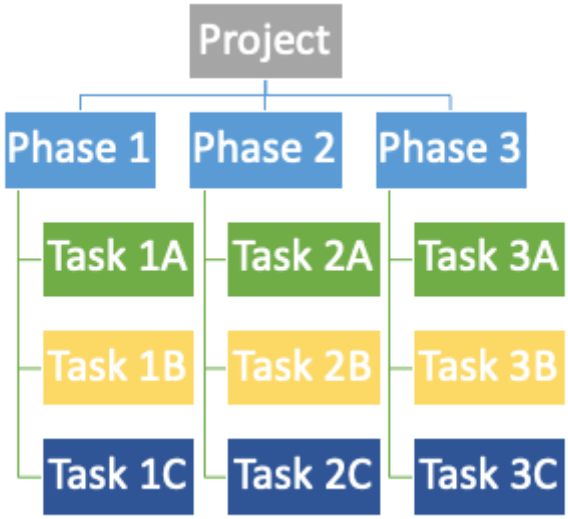
Critical Path Method (CPM) (also referred to as critical path analysis) is used to identify and schedule the most critical tasks within a project, along with dependencies. The critical path becomes the longest sequence of critical tasks within the project. This critical path will be used to support your schedule development (Stelth and Le Roy 2009; Ahmed 2018; Nassar 2018; Atin and Lubis 2019). Within the critical path, milestones need to be documented as they are used to ensure that one task (or phase) is complete and that the project can move to the next.

How to apply critical path

There are several steps which can be followed to find the critical path and apply this method to a project (Stelth and Le Roy 2009; Ahmed 2018; Nassar 2018; Atin and Lubis 2019).

Step 1: List activities. Using a work breakdown structure, list all the project tasks and activities which need to be completed to reach the end-state. The development of this list (as outlined in Figure 13) supports the development of the next step.

Figure 13. Work breakdown structure example, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0



Step 2: Identify dependencies. Through the work completed within the work breakdown structure, consider what the dependencies are between tasks. For example:

- Task 1B is dependent on 1A
- Task 2A is dependent on 1A
- Task 1C is dependent on 1B
- Task 2B is dependent on 2A
- Task 2C is dependent on 3A
- Task 3C is dependent on 3B
- Task 3C is dependent on 3C

These dependencies outline the project sequence and help determine the critical path.

Step 3: Create the network diagram. Transfer the work breakdown structure into a flowchart or network diagram which shows the linearity of activities. Each box should contain 1 task and arrows are used to outline dependencies.

Step 4: Task duration estimation. Critical path is calculated by determining the longest sequence of critical tasks. To achieve this, each task's duration must be estimated. To help make educated estimates, use:

- experience and knowledge
- previous project or historical data
- industry standards.

There are also forward and backward pass techniques which can be used in the following ways:

- *Forward pass*: calculates the earliest start (ES) and earliest finish dates (EF). This uses previously

stated start dates. The ES is the highest earliest finish EF dates from their closest predecessors. While EF is the ES in addition to duration (outlined in each task).
    - Within the calculation, ES is the first activity and proceeds through each task based on the estimated timeframes allocated, until you reach the EF value.
- *Backward pass:* calculates the latest start (LS) and latest finish (LF) dates. The LS is calculated as the LF minus the duration, while the LF is calculated from the lowest LS value from the immediate successor task.
    - The schedule is developed by working backwards through the entire process.

These values can be used to calculate the float or allocation of scheduling flexibility which can be added to each task.

Step 5: Critical path calculation. The critical path can be calculated both manually and through an algorithm.

To calculate the critical path:

- Document start and end times for each activity.

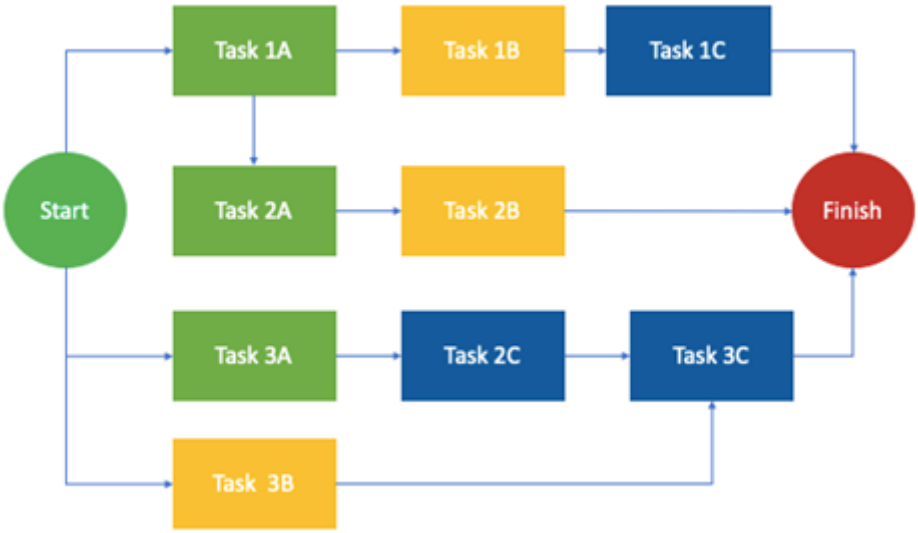
    Activity 1 starts at 0 and the end time is the duration of the activity.

    The following activity starts at the end time of the previous activity, the end date/time is the duration from the start.

    Complete for each activity.

- Identify the end time of the last activity of each sequence – this will help determine the duration of the whole sequence.
- The activity sequence with the longest duration is the critical path. This is outlined in Figure 14.

Figure 14. Critical Path example, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0



Step 6: Float calculation. Slack or float is defined as the flexibility of a task schedule; that is, how long a task can be delayed without impacting later tasks.

Float can be used for:

- project risks
- unexpected issues
- delays
- resourcing constraints.

Floats are calculated manually. There are two types of floats (Atin and Lubis 2019):

- Free float: how long an activity can be delayed without delaying the subsequent activity. Free float only occurs when two or more activities have the same successor. Free float equals next task ES minus current task EF.
- Total float: amount of time an activity can be delayed without impacting the project end date. The total float equals LS minus ES or LF minus EF.

Where critical tasks have no float, they have no flexibility. Positive float tasks should not be in the critical path, as they can be delayed without affecting the project end date. Therefore, as a result, non-critical tasks can have resources reallocated from them to critical tasks.

Advantages of a CPM

The application of CPM provides several advantages, including:

- improved future planning by comparing expected to actual progress

- improved resource management by prioritising tasks and identifying where resources need to be
- decreased bottlenecks by outlining the dependencies between tasks so that there is a straightforward way to view the flow in the project.

Disadvantages of CPM

There are several potential disadvantages of CPM:

- estimating the end date of an activity can be difficult
- the critical path can be unclear
- networks can be complex due to the size of the project
- resource allocation is not documented within the critical path.

How to decide whether to use CPM

CPM can be especially useful in the following circumstances:

- for large-scale, complex projects
- for projects with numerous dependencies
- to support planning through visualising tasks and dependencies
- to identify critical tasks that require attention and resourcing
- when the project has strict deadlines.

CPM might not be appropriate when:

- the project is simple
- the project requires flexibility or agility
- deadlines, timings, and duration are unclear.

In sum, the CPM is a traditional and sequential form of project management. CPM can also be used as a tool to support project planning and scheduling. Using CPM, a project manager and team can see the dependencies between tasks, the criticality of different sequences of tasks and the resource requirements. The method is used to help keep projects on track and within budget as it provides visibility.

Critical Chain Project Management: reserve resources for the most critical tasks

Critical Chain Project M anagement (CCPM) is defined as a method of project management and planning which emphasises the need for resources (including people, materials, equipment) which are needed to complete the project tasks (Leach 1999, 2000; Raz et al. 2003; Updegrove 2014). The CCPM method

follows the CPM but then includes further steps. The CCPM seeks to address issues within the CPM. These issues include requiring the time duration for each task, and the duration from the beginning to the end of the project (Leach 1999, 2000; Raz et al. 2003; Updegrove 2014). Due to the requirement for estimates, some of the timeframes are unrealistic when applied.

Using CCPM allows for additional time for the human components of the project, including resourcing issues and delays (Updegrove 2014). Buffers are built into the project to account for different events happening.

The focus of this method requires the project manager to determine the critical chain. This includes the resource and activity dependencies, which inform the longest sequence of tasks (Leach 2000; Updegrove 2014). Therefore, critical project resources need to be balanced to support the critical path.

CCPM provides greater control over the project and schedules; however, it is a complex method to apply. Project teams require considerable training and capability development (Leach 1999, 2000) and this can be especially challenging when it comes to adapting to the constraint-based methodology.

Components of CCPM

There are several components of the CCPM approach (Updegrove 2014):

- Critical path: the longest sequence of dependent tasks required to complete a project.
- Feeding chain: the secondary chain of dependent tasks that run concurrently with the critical path.
- Project buffers: safeguards built into the project.

There are 3 key types of buffers:

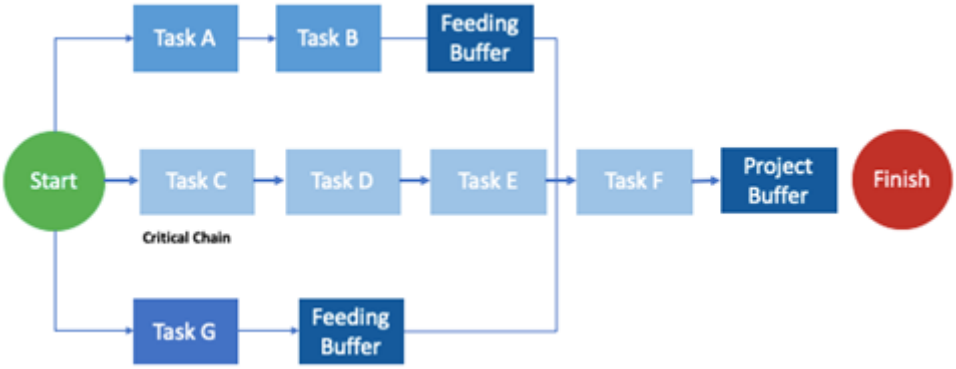
- Resource buffers: resources set aside to support critical chain.
- Project buffers: extra time allocated to the final task and the end of the project.
- Feeding buffers: extra time allocated to the feeding chain.

Steps in CCPM

This process involves 7 steps (Leach 2000; Raz et al 2003; Updegrove 2014):

Step 1: Identify the critical chain. Outline critical tasks that will sequentially take the longest to complete. Figure 15 shows an example of the critical chain.

Figure 15. Critical chain example, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0



Step 2: Outline resource constraints. Consider the limitations that may affect how tasks are completed.

Step 3: Specify team focus. Ensure that the project team are focused on completing their activities. This will support efficiency and collective problem-solving.

Step 4: Discourage multitasking. This can encourage project team members to focus specifically on their tasks.

Step 5: Utilise 50/50 time estimates. Decrease time estimate by 50% – this will encourage the team to be more efficient with scheduling. Buffers are still required.

Step 6: Develop buffers. Use the 50% removed in the previous step to create a buffer.

Step 7: Develop a detailed project plan. Track the project to understand how work is progressing and whether the buffers are needed, and to identify any risks.

Advantages of CCPM

Applying CCPM offers several advantages:

- promotes concentration on work
- encourages team morale and performance
- decreases float mismanagement
- outlines minimum time required to finish
- speeds up project completion
- reduces expenditure.

Disadvantages of CCPM

Some of the disadvantage of applying CCPM are:

- project team dedication is required

- if the team is not working toward a common goal, outcomes can be clouded
- it does not support big planning requirements
- it is new method which requires more documentation and support.

When CCPM might not be appropriate

There are instances in which CCPM might not be the best choice, including when:

- the critical path method sounds good in theory, but more realistic measurements are required
- overestimated task durations to document a buffer have not been clearly calculated, therefore the CCPM doesn't support accurate data and we are unable to have accurate projections.

In sum, CCPM is a traditional and sequential project management methodology. The critical chain outlines the longest path of tasks with dependencies within a project, including the resource requirements and potential impacts on the scheduling. Therefore, the critical chain approach focuses on the schedule, which supports the different activities which are critical to the outputs, especially when delays in activities or tasks could have an impact on the end date of the project.

Test your knowledge

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://jcu.pressbooks.pub/pmmethods/?p=104#h5p-10

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://jcu.pressbooks.pub/pmmethods/?p=104#h5p-11

Key Takeaways

- Traditional project management requires engaging a project manager or the Project Management Office to hold central responsibility over the project.
- The Waterfall method is based on completing tasks and phases in a linear manner, whereby each stage must be completed before the following begins.
- The CPM (also referred to as critical path analysis) is used to identify and schedule the most critical tasks within a project, along with dependencies. It's the most used methodology for everyday project management.
- The CCPM provides greater control over the project and schedules. However, it is a complex method to apply.

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5.

THE AGILE FAMILY: GROUP I

Learning Outcomes

- Determine the importance of Agile project management.
- Assess the elements of Scrum.
- Analyse the processes of Kanban and Scrumban.
- Evaluate the variations between Scrum, Kanban and Scrumban methods.

Overview

Agile project management is defined as an iterative approach to managing projects, focused on continuous and incremental release of outputs. Within these incremental releases, clients and end users are able to provide feedback, and changes or updates are able to be made.

Core values

Within Agile project management there are 4 core values:

1. Individuals and interactions over processes and tools.
2. Working software over comprehensive documentation.
3. Customer collaboration over contract negotiation.
4. Responding to change over following a plan.

The core values highlight the importance of the factors to the left in contrast to those on the right, which are typical of Waterfall project management. The core values are used to inform the standard way of working and highlight that collaboration and a people-driven approach is necessary for the appropriate application of Agile. Additionally, organisations need to build trust, commitment, identity, visibility, and leadership (Chikhale and Mansouri 2015). The end goal of Agile is to deliver something that is functional and provides significant value to the end user. These core values link into the principles of Agile.

From these values flow agile governance, which follows the same principles of being iterative and flexible. Agile requires rapid decision-making, using minimum effort governance processes and without the need for heavy front-end planning. There are identifiable governance points within the Agile process including authority, standard practices, metrics, and artifacts, which are part of the planning phase. Therefore, for Agile governance to occur there needs to be (Disciplined Agile Consortium 2014):

- collaboration over conformance
- enablement over inspection

- continuous monitoring over quality gates
- transparency over management reporting.

Collaboration, both within and outside the organisation, is a vital component of successful implementation of Agile. Stakeholders' commitment needs to be sought early on to promote transformation, adaptation and flexibility, and there must be alignment between organisational strategies and business plans.

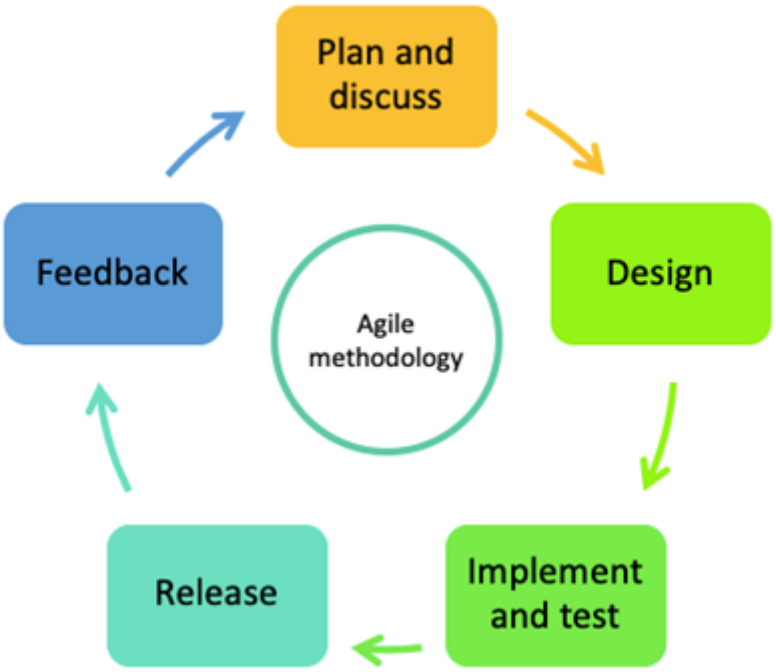
12 Agile project management principles

Within the Agile Manifesto (2001), there are 12 key principles of Agile project management:

1. The number one priority is customer satisfaction through the early and continuous delivery of valuable outcomes.
2. Changing developments are welcome, even late in development. Agile processes harness change for the customer's competitive advantage.
3. Deliver working outputs frequently, from a couple of weeks to a couple of months, with a preference for the shorter timescale.
4. Businesspeople and developers must work together daily throughout the project.
5. Build projects around motivated individuals. Give them the environment and support they need and trust them to get the job done.
6. The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.
7. Working outputs are the primary measure of progress.
8. Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.
9. Continuous attention to technical excellence and good design enhances agility.
10. Simplicity — the art of maximising the amount of work not done — is essential.
11. The best architectures, requirements, and designs emerge from self-organising teams.
12. At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behaviour accordingly.

Agile methodology encourages delivering outcomes in iterative stages, as it is better for the outcome to be tested and improved over time. Additionally, collaboration is key. The process of collaboration should be across all departments and for successful delivery it is fundamental to develop strong interpersonal relationships. Figure 16 outlines the common phases within the Agile methodology.

Figure 16. Common phases in Agile methodology, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0



How to apply Agile

There are 7 steps that can be used to support the implementation of Agile project management.

Step 1: Document the vision and scope for the project within the planning meeting.

- Planning meeting:

  At the start of the Agile project (similar to any other project), the business need should be established.
  The first meeting covers strategic planning. It requires the project team to consider what the scope is.
  The planning meeting should ask each client, stakeholder, and project team member the following question:

  Who is our target client?
  What is the need?
  What is the product name and the product category?
  What are the key benefits?
  What are the key differentiation points?

  Attendance – Those individuals required to obtain buy-in:

  key stakeholders

project owners
project team members.

When – Before the project starts.

Length – Between 4 and 16 hours; however, this should be broken up over a period of days.

Step 2: Develop the project roadmap

- Roadmap

Translate the conversation and agreement from the planning session to a roadmap.
It should provide a high-level view of requirements, user stories, and time frames.
Each goal should include:

date
name
goal
features
metrics.

The product owner is responsible for the development; however, support should be obtained from key stakeholders or subject matter experts.
It should be developed prior to starting sprint planning.

Step 3: Release plan

- A high-level timeline needs to be developed to outline potential or proposed release dates.
- The release should document between 3 to 5 sprints.
- The project team should work with the project owner, project manager and Scrum master to develop the plan.
- A new release plan should be created every quarter.

Step 4: Sprint planning

- The project team develops a plan for what will be developed within the short iteration (sprint), determining the specific tasks and activities, along with the goals of each sprint.
- A list is created of a backlog of tasks which can be completed within the sprint.
- This occurs at the start of each sprint and takes approximately 2 hours.

Step 5: Progress tracking

- Use daily stand-ups to monitor the team progress – these are approximately 15 minutes each. In this stand-up, each team member will outline:

  work completed the day before
  work to be completed today
  any challenges.

Step 6: Sprint reviews

- At the end of each sprint a review should be completed to highlight the work completed.
- Feedback is also obtained in these sessions and supports continuous improvement.

Sprint 7: Sprint retrospective

- Continuous learning is a requirement of Agile. Therefore, after each sprint a retrospective is used to understand what worked and what requires improvement from the previous sprint.
- All project team members should be there.
- The key questions for the retrospective include:

  Did everything go to plan?
  How was the workload?
  What are the improvements?
  Did you learn anything that will support the project?

- Post retrospective the project team will return to Step 4 and start sprint planning again.

Benefits of Agile

There are several documented benefits of Agile project management methods which relate to the iterative and flexible nature of the delivery (Brunet and Aubry 2016):

It empowers team members to make decisions – it increases project team member autonomy to implement ideas, be innovative and solve problems.

It's adaptable – you can manage changing priorities, based on continuous feedback and collaboration.

Decreased risk – due to the sprint cycles there is better project visibility and increased reporting requirements which are based on actual conditions.

Improved customer satisfaction – due to the collaborative element, stakeholders are encouraged to co-design and provide real-time feedback.

In sum, Agile methodologies are cyclical project management processes that support organisations and project managers and teams. This approach supports projects which are unclear and require iterative outcomes. The Agile approach requires the project team to collaborate with clients and key stakeholders throughout. Through this approach outcomes are supported, the team is goal oriented, and making incremental improvements.

The following methodologies are part of the Agile family:

- Scrum – method focus is on sprints, clearing out roadblocks
- Kanban – method focus is on tasks made visual in lanes
- Scrumban – method focus is on iterative planning

Let's discuss each of these methods in more detail.

Scrum

The Scrum method involves working within a team, led by a Scrum Master. The role of the Scrum Master is to complete work required, remove any obstacles impacting project outcomes and collaborate to meet the desired end-state (Pichler 2010; Rubin 2012; Verheyen 2015; Ockerman and Reindl 2020; Scrum Guide 2020). Similar to the Agile method, work is completed within short cycles or sprints. Within these sprints the team will meet daily, holding stand-ups where they discuss current work on hand, support required and roadblocks.

There are 3 key pillars of Scrum (Scrum Guide 2020):

Pillar 1: transparency
Pillar 2: inspection
Pillar 2: adaption

To use Scrum, the project must start with a clear purpose which is either provided by or to the business, and a set of requirements which are prioritised (Rubin 2012; Verheyen 2015; Scrum Guide 2020). There are several key terms and components which make up Scrum (Scrum Guide 2020):

- **Features**: these requirements are created by the client and/or organisation.
- **Backlog**: storage document which outlines all features which are yet to be started. Backlogs are maintained by the Product Owner.
- **Product Owner**: the client or representative who is responsible for prioritising work.
- **Sprints**: short or set periods of time which the team is allocated to complete selected work or features. These can be between 1 and 4 weeks. The length should be consistent throughout the project life cycle.

The Scrum Guide (2020) outlines a number of elements that need to be completed or considered during the course of a project:

- Team members select requirements from the backlog, and they identify requirements which are achievable in the time-frame.
- A sprint backlog is created to document requirements and tasks that need to be discussed as part of the sprint planning meeting.
- As the team commits to the sprint backlog, work begins on key tasks and requirements.
- During the sprint, teams are protected from interruptions and their focus is on meeting outcomes.
- During the sprint, no changes are made to the backlog.
- The backlog requirements and priorities can be shifted in preparation for the next sprint.
- Daily stand-ups occur each day (15-minute meetings). Team members share what they completed yesterday, plan for today and discuss any blockers.
- At the end of the sprint, the team will share their completed work with the key stakeholders and clients. This will be used to obtain feedback to support future work. Reflection sessions (also called retrospectives) are used to support improvements.

Roles and responsibilities

Within the Scrum Guide (2020) there are 3 primary roles:

Scrum Master: responsible for the process and advocates for the team. They are responsible for removing obstacles or blockers, supporting team communications through discussion and mediation, negotiates resources and negotiates with the external team. They are primarily there to support the team.

Product Owner: responsible for representing the client's voice and making decisions regarding the project priorities. They are the owners of the backlog, communicate the stakeholder's vision, and works with the team daily to answer questions and provide guidance and support.

Project Team: the team is comprised of 7 members (plus or minus 2), who are responsible for project delivery. They are responsible for the estimations, committing to tasks, and daily status reports. The team should also be self-organising, requiring no specific structure.

Applying Scrum

Figure 17 shows the key phases within the Scrum process. It highlights that there are several different components within Scrum, including multiple meetings (also referred to as ceremonies). These ceremonies include sprint planning meetings, daily stand-ups, review sessions and retrospectives. There are several reporting requirements and steps within Scrum (Pichler 2010; Rubin 2012; Verheyen 2015; Ockerman and Reindl 2020; Scrum Guide 2020), including:

Step 1. Familiarisation with the Scrum guidelines: understand the steps required to use Scrum within a project.

Step 2. Assign roles within Scrum teams: identify the Product Owner, Scrum Master and development/ project team members.

Step 3. Create backlog: identify the breakdown of the different tasks and activities required.

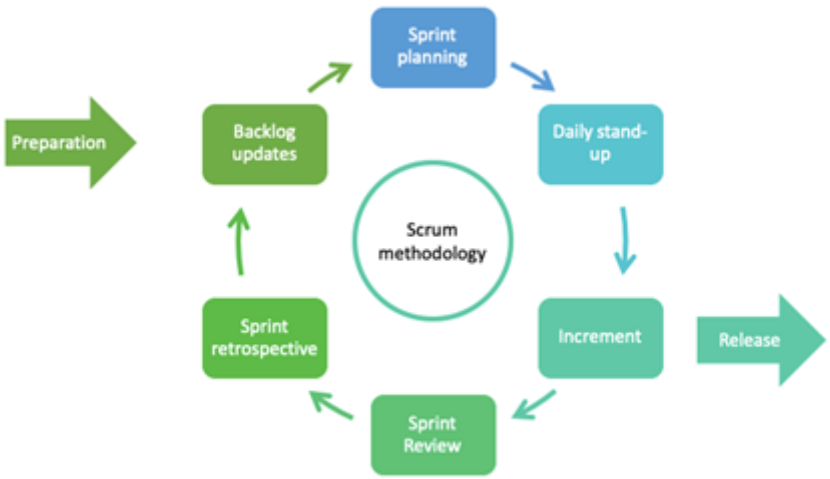
Step 4. Sprint planning meeting and daily stand-ups: held on the first day of each sprint. All members should attend. Within this meeting:

> Product Owner presents the next priorities that need to be completed.
>
> Project team determines how these priorities will be addressed, including estimating how long items will take and what the project team can commit to.
>
> Daily stand-up allows team members to provide updates on their progress.

Step 5. Determine sprint start and end dates: ensure that each project team member is aware of the length of a sprint, when they start and when they finish.

Step 6. Review and reflect: at the end of each sprint, run a reflection session to understand what worked and what did not, while ensuring performance is reviewed.

Figure 17. Scrum process example, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0



Additionally, the project team needs to track their progress. Once work has commenced, progress is tracked through 'radiators'.

Radiators are visible information documentation, including burn down charts of tasks and the task status board. An example of this is outlined in Figure 19. There are normally 5 columns:

Story – voice of client
To do – tasks
In process – work underway
To verify – work requiring testing
Done – completed work

Advantages of Scrum

There are many advantages to applying the Scrum methodology:

- supports the delivery of deliverables efficiently
- effective use of resources, schedule, and budget
- work is divided into manageable chunks
- work is developed and tested within a sprint
- fast development cycles
- transparency of work completed, next steps and issues
- client and team feedback adopted regularly.

Disadvantages of Scrum

There are also a few disadvantages to applying Scrum:

- scope creep can occur
- lack of specific end date
- without commitment from and cooperation of the project team, clients, and stakeholders the project can fail
- Scrum in large teams is difficult
- experienced team members are required
- daily meetings can be burdensome
- project team members exiting the project early can hinder outcomes
- quality metrics can be hard to determine and compare against in the fast-paced environment.

In sum, Scrum is a common form of Agile project management. This framework supports team members to collaborate with one another, clients, and stakeholders to support achieving the goals and outcomes of the project. Due to its iterative and incremental nature, Scrum is a flexible process which is aimed at satisfying the client's expectations.

Kanban: tasks made visual in lanes

Kanban is a project framework which is used to visually implement Agile. This requires the encouragement of small, incremental updates to the project, systems and teams as required. It is used to remove blockers and to manage and improve the ability to meet requirements, demands, and the capacity of team members (Anderson 2010, 2016; Burrows 2014; Steyaert 2018). The work items are visualised using a Kanban board. This provides team members and stakeholders with a visual of the project progress, the processes, and next steps (Anderson 2010, 2016; Burrows 2014; Steyaert 2018). Work is allocated from the board as team member capacity permits and completed in an order that builds upon the last item.

Kanban is used to support decision-making about what, when and how much can be completed. In addition, Kanban is often used in combination with other Agile methods, including Scrum, and is normally applied to software development (Anderson 2010, 2016; Burrows 2014; Steyaert 2018). Kanban has been known to improve team productivity, outputs, quality, and reduce waste.

Kanban does not require users to follow specific procedures – it is a simple framework. It is often used to support existing work processes and is easy to establish in different industries.

Principles of Kanban

There are 5 core principles within Kanban (Anderson 2010, 2016):

1) **Visualise the workflow**: visualisation is key to the use and success of Kanban. Through visualisation the work can be understood, progress documented and issues mitigated early.

2) **Limit work in progress**: determine the amount of work achievable by the project team, across each phase, and how the workflow is being and can be tracked.

3) **Manage and enhance flow**: workflow is constantly monitored and improved, and used to support and track performance.

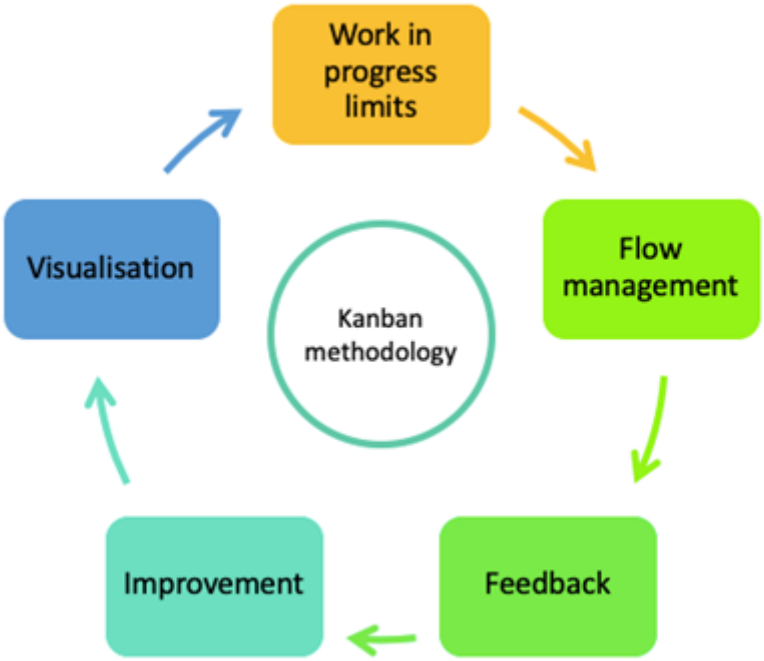
4) **Make workflow clear**: improvements to workflow efficiency ensures that each project team member is aware of the steps, processes and procedures of the project management method utilised.

5) **Continuous improvement:** team using the Kanban process should be able to identify issues and encourage feedback to ensure the process is always improved.

Steps to apply Kanban

The 5 principles of Kanban also form the 5 steps for applying the method to a product, service, project or outcome (Anderson 2010, 2016; Burrows 2014; Steyaert 2018). This is visually represented in Figure 18, and the detailed steps are outlined below.

Figure 18. Kanban phases, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0



Step 1. Workflow visualisation. Map the process currently in use for delivery of work, either physically or digital boards. Within the visualisation there are columns which represent a step for the addition of new work. Every step should be mapped, from start to finish. Figure 19 shows the potential columns that can be used to develop the Kanban board.

Figure 19. Column examples within a Kanban board, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0

Step 2. Apply work in progress constraints. The number of tasks that can be completed at a time are limited. The exact number of tasks depend on the type of work underway. Work should not move to the next column until there is space for it.

Step 3. Outline clear policies. Work within the project can be classified into different complexities, dependencies and interrelationships. Within these classifications, some tasks will be prioritised over others, including work that will have a high cost if delayed.

Step 4. Flow measurement and management. The metric is used to measure cycle type, throughput and quality of work completed. This step requires the analysis of the average time taken to complete work and move it on, whereas throughput is the units which are moved during the period of work.

Step 5. Optimisation using empirical evidence. Understand the impact of changing the Kanban before making the change and ensure that the outcome is measurable and specific. When changes are made, ensure that the performance is logged and reconfigured as required.

Kanban advantages

There are several documented advantages to applying Kanban, including:

- **Increased flexibility:** there are no set durations; it is a fluid method which re-evaluates priorities as the latest information becomes available.
- **Reduced waste:** the focus is on waste reduction and ensuring project teams do not waste time on unnecessary work.
- **Easy to get started:** it is visually intuitive and easy to understand, so the project team do not need

to learn a new methodology.
- **Improved flow:** the just-in-time approach is based on delivering work at regular intervals.
- **Minimise cycle time:** the entire project team focuses on reducing blockers and ensuring that work moves quickly through the process.

Kanban disadvantages

There are several documented disadvantages to applying Kanban, including:

- **Overcomplicated board:** applied properly Kanban is simple; however, many times the boards are unclear and difficult to follow.
- **Outdated board:** poor board maintenance creates the risk of the project team working off inaccurate information.
- **Lack of timing:** columns are labelled with phases (to do, in progress, complete), so timing can be difficult to track.

Using Kanban

Kanban can be used across tangible and intangible projects, depending on the level of workflow, and the existing processes in place. It is important to remember that there are complexities associated with the prediction of delivery timeframes (Anderson 2010, 2016; Burrows 2014; Steyaert 2018); therefore, these are some of the factors that should be considered before using Kanban:

- flexibility is required
- estimation of scheduling is not required
- deadlines are not fixed
- continuous improvement is required
- the aim is to release product approval at any point of the project life cycle
- change is not supported by your team
- the provided system needs to be easy to follow
- improvement of delivery flow is a priority.

Kanban vs. Scrum

Both Kanban and Scrum are Agile methodologies; however, they differ in several regards:

- Scrum requires specific roles and responsibilities.
- Scrum is iterative and time-based, following process improvement and release.
- Kanban does not include required activities and/or timelines.
- Kanban limits work in progress to the capacity of the team, whereas Scrum requires the limiting of

work in progress in each iteration.
- Scrum leans to rigidity and change resistance (during a sprint), whereas Kanban embraces change.
- Scrum boards reset after each sprint; Kanban are used continuously.

Scrum and Kanban have the following similarities:

- They are empirically tested processes.
- The project team can work simultaneously on multiple projects.
- Work in progress is limited.
- They use pull scheduling.
- The focus is on delivering early and often.
- Transparency is used to improve processes.

In sum, Kanban is another common form of Agile project management, and it also can be used as a tool to support work allocation and completion. The value Kanban provides is within the visualisation of the project tasks and activities, which improves workflows due to the transparency provided. The use of Kanban as a project method can support improved efficiencies of the project team, reduced waste or mistakes and an overall improvement in the team's focus by limiting what work they can focus on.

Scrumban

Two Agile project management methodologies form the basis of Scrumban – Scrum and Kanban. Scrumban takes the flexibility from Kanban and the structure and routine from Scrum to create a hybrid environment that encourages a more agile, efficient, and productive workflow (Ladas 2009; Reddy 2015; Blokdyk 2017; Rao 2017).

Scrumban also supports the management and guidance through the development of task-based outcomes (Ladas 2009; Blokdyk 2017; Rao 2017; Reddy 2015). Using short iterations, much like sprints, Scrumban enables teams to manage and control their workloads.

Figure 20. Scrumban phases, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0

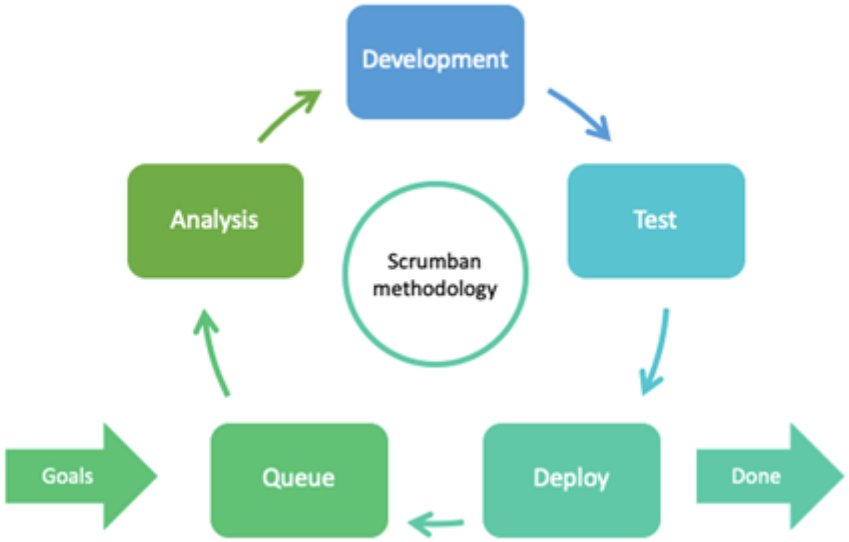


Figure 20 shows the primary phases commonly outlined or followed within the Scrumban project methodology. Each iteration starts with the identification of the goals, which are documented within the queue (similar to the backlog). This sets out the priorities. Each of these items within the queue are then analysed, outlining the key features and elements required for their completion. Next is the development phase, where the implementation work is completed. Once complete testing has been undertaken to ensure that the item works as intended and future improvements are documented as needed, the item is deployed or finalised. This is a cyclical approach that will continue until all the goals and requirements are completed or the schedule and budget run out.

Elements of Scrum within Scrumban

- Iterative planning at regular intervals, supported by reviews and retrospectives.
- Teams decide on how much work is completed in the sprint based on work complexity.
- Demand-based prioritisation ensures that the team is working on the most vital task.
- Assurance of work ready to begin (definition of ready).
- The use of the 'ready' queue (between Backlog and Doing) to organise what's next.

Elements of Kanban within Scrumban

- Continuous workflow removed from Kanban board as needed.
- Work in progress limited.
- Project team roles not clearly specified.
- Short-lead times allow for just-in-time analysis.
- Process-based diagrams expose weaknesses.
- Focus is on cycle time.
- Policies to support process steps.

Steps to apply Scrumban

There are several steps involved in applying Scrumban to a project, with clear links back to the Kanban and Scrum methods (Blokdyk 2017; Rao 2017). These steps are as follows.

Step 1. Scrumban board development. Similar to Kanban, each column should outline the distinct phase that work will go through.

Step 2. Establish work in progress limits. This includes task and time limits for each sprint. With a focus on continuous workflow, this requires awareness of how much work can be completed by the project team at a given point.

Step 3. Prioritise the board. Establish the priorities of the project and tasks within the board. The project team will decide on what tasks are allocated to which individual.

Step 4. Predefine sprint timeframes. Sprint timeframes should be established at the beginning of the project.

Step 5. Set daily meetings. Hold short stand-ups for the team members to discuss what they will be completing that day and any challenges they may face. At the end of each sprint, these daily meetings should be used for reflection and retrospective.

Advantages of Scrumban

- **Saves time:** with no sprint planning, plans are made as required.
- **Compartmentalisation:** allows the project team to focus on what they are currently delivering.
- **Identify issues:** bottlenecks and issues can be identified within the workflow and resolved due to the visual nature of the planning.
- **Clarity:** transparency of the priorities through the visualisation.
- **Intuitive**: easily adopted method, only one planning meeting, and rules are straightforward.
- **Independence**: project team members are independent, and they have autonomy to choose tasks.

Disadvantages of Scrumban

- As it is a new method, there are no clear guidelines or best practices to support implementation.
- Effort can be difficult to track due to project team member autonomy.
- Progress snapshots are not always clear on how much longer something will take or how long something took to complete.
- The project manager's level of control can be difficult to maintain.

In sum, Scrumban is a more recent addition to the Agile project management methodology suite.

Scrumban uses the structure provided by Scrum along with the visualisation and flexibility provided by Kanban. Therefore, it can be used to support workflow management for a team or be used to support teams transitioning from Scrum to Kanban.

Suggested reading

Now that we have introduced the first group of the Agile family, we recommend the following 3-minute reading by Emily Bonnie, discussing '8 Attitudes guaranteed to sink your Agile projects'. The article highlights a very important point: there is a big difference between doing Agile and being Agile.

Test your knowledge

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://jcu.pressbooks.pub/pmmethods/?p=121#h5p-12

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://jcu.pressbooks.pub/pmmethods/?p=121#h5p-13

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://jcu.pressbooks.pub/pmmethods/?p=121#h5p-14

Key Takeaways

- Agile project management is defined as an iterative approach to the management of projects which focuses on continuous and incremental releases of outputs.
- To use Scrum, the project must start with a clear purpose which is either provided by or to the business and a set of requirements which are prioritised.
- Kanban is a project framework which is used to visually implement Agile. This requires the encouragement of small, incremental updates to the project, systems and teams as required.
- Kanban can be used across tangible and intangible projects, depending on the level of workflow, and the existing processes in place.
- Two Agile project management methodologies form the basis of Scrumban – Scrum and Kanban.

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6.

THE AGILE FAMILY: GROUP II

In addition to the Agile methods outlined in Module 5, there are two more primary methods that we will discuss here.

Learning Outcomes

- Contextualise key benefits of Extreme Programming as an Agile method.
- Conceptually map the Extreme Programming life cycle.
- Critically review key phases in the Adaptive Project Framework.

Extreme Programming: short work sprints, frequent iterations, constant collaboration

Extreme Programming (XP) was briefly introduced in Module 2. We'll spend more time explaining this methodology here, because it is just as important to the Agile group as it is to the uncertainty group of methodologies. XP is defined as an Agile project management framework (also referred to as a software development framework). The aim of XP is to produce improved quality outcomes, including product outcomes, and the workflow and work culture of the project team (Wells 1999; Beck 2004; Blokdyk 2017; Smith 2019). Of the Agile frameworks, XP specifies more clearly the need for proper engineering practices along with the use of the Agile framework.

To apply XP, there are specific characteristics a project should have (Wells 1999):

- ongoing changes to requirements
- potential impact of risks associated with allocating fixed times, especially with innovative technology
- small teams who are co-located
- technology that allows for automation of functionality supported by testing.

Values

There are 5 primary values of XP project management (Wells 1999; Beck 2004):

1. Communication. A vital component in the process is transferring knowledge from team members to

support the broader project objectives. There needs to be clear communication mechanisms. XP prefers face-to-face mechanisms.

2. Simplicity. This considers the minimum viable product or outcome. Therefore, the aim is to simplify the design and process as much as possible, to support the project outcomes, maintain momentum and revise and improve as needed.
3. Feedback. This needs to be obtained from clients, stakeholders, and team members at frequent intervals to understand what works and what does not. The aim is to improve and rework practices, and support designing simple outcomes.
4. Courage. This is defined by Beck (2004:20) as 'effective action in face of fear'. Therefore, XP is based on taking actions to obtain results, based on the other values. These actions relate specifically to team effectiveness, reduction of waste and obtaining and using feedback.
5. Respect. There needs to be mutual respect between the team members as this will support open communication and working collectively to achieve outcomes.

Practices

There are many XP project management practices and they are all interconnected and support the successful delivery of a project (Wells 1999; Beck 2004; Blokdyk 2017; Smith 2019). There are 12 practices that fit within 4 categories:

1. Fine Scale Feedback

Pair programming: this requires 2 team members working collaboratively on one machine. The purpose behind this is that 4 eyes are better than 2, allowing for effective code review and problem-solving.

Planning game: per iteration the planning game is played. It is used to support delivery of outcomes. There are 2 parts:

- Release planning – focus on what will be included in the next releases, and when they will be delivered. This includes the project team (developers) and customers. There are 3 phases within release planning:

  Exploration – clients provide a list of requirements, documented on user story cards.

  Commitment – developers will commit to developing the functionality within the next release.

  Steering – plan may require adjustment, and new requirements can be added to the plan.

- Iteration planning – this requires the planning of activities and tasks for the developers to complete. This is also divided into 3 phases:

Exploration – requirements are translated into tasks, which are recorded on task cards.

Commitment – tasks are assigned to the developers, along with a specified timeframe for completion.

Steering – tasks are completed and the results are tested against acceptance criteria.

Test-driven development: tests are completed to assure the functionality of outputs; these are determined before the outputs are delivered. This encourages the developers to consider the potential issues that could occur after the delivery of a task.

Whole team: the client needs to be a key part of the development of the project outcomes and testing; this ensures that the outputs are fit for purpose.

2. Continuous process

Continuous integration: the project team needs to be always working on the latest version or requirements of the outputs. This requires a clear process of version control and is especially relevant for software development and continuously updating code to meet the teams' updates.

Design improvements: due to the aim for simple outputs, there is a need to complete ongoing maintenance during the project. This includes functional improvements or upgrades and the flow-on effect of different changes that occur during the project.

Small releases: frequent releases of outputs are completed to provide ongoing value to clients. This supports the idea of the client being a key part of the team, and the importance of feedback.

3. Shared understanding

Straightforward design: based on the simple is best model, this requires developers to consider if this is the simplest way to introduce a new function or requirement.

Coding standard: also referred to as design standards. This is where a set of rules are developed and agreed upon by the entire project team. These need to be adhered to, ensuring a consistent style and format.

Collective ownership: this refers to shared team ownership, where everyone is responsible for the outputs and outcomes. Therefore, anyone is allowed to make updates to code, and everyone is responsible for maintaining it.

Metaphors: this involves the development of a story or concept which everyone within the project understands and shares. This requires the developers to provide clear names and descriptions for functionality provided.

4. Programmer welfare

A realistic and sustainable pace: this is the idea that developers should work a maximum of 40 hours per week. Where overtime is required in one week, this should not follow onto the next week.

Within these principles there are a few additional components (Smith 2019):

Stories: provide a clear description of what the outcomes will be for the project, specifically describing what is meaningful or necessary for clients. These provide short descriptions of the work required.

Weekly Cycle: forms an iterative period, where the project team collaborates on the first day to discuss progress, liaise with clients, determine the next set of requirements and discuss the next steps.

Quarterly Cycle: defined as the release period. The detailed work is completed as part of the weekly cycle; however, the work is planned in quarters to understand what the release will look like.

Slack: these are the low priority tasks within both weekly and quarterly cycles that can be cancelled if the work is falling behind.

Key roles and responsibilities

There are several specific roles that need to be established within the application of XP (Wells 1999; Beck 2004). The 4 most common include:

1. Client/customer – responsible for making business decisions regarding the project outcomes. This requires considering:

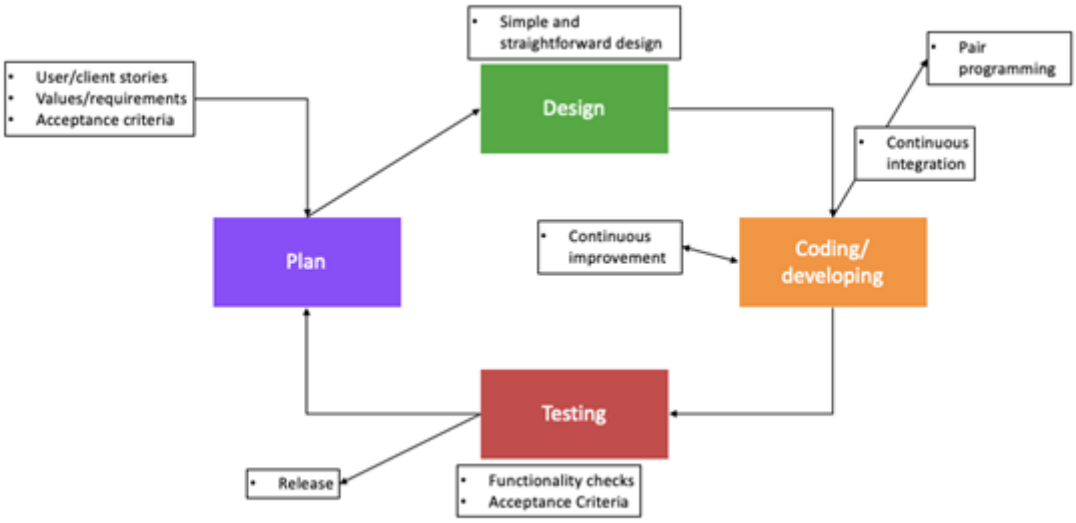
   What does the system need to do?
   What are the acceptance requirements?
   How much do we want to spend?
   What is next?

2. Developer – project team members are labelled developers. They are responsible for delivering work to the client. A developer can be anyone in the project team, and it is not limited specifically to skill sets.
3. Tracker – the person responsible for keeping track of the work underway to determine progress against plan.
4. Coach – commonly an outside consultant who supports the application of XP. They mentor the project team on the XP practices and support establishing healthy habits and behaviours.

Extreme programming life cycle

The life cycle can be broken down by both weekly and quarterly cycles and the steps below and within Figure 21 show the specific steps (Wells 1999; Beck 2004; Blokdyk 2017; Smith 2019).

Figure 21. XP life cycle, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0



Step 1. Liaising with clients. This step requires liaising with clients or customers to understand what their requirements are. This involves establishing stories, which are broken into timeframes and corresponding tasks. Value is also assigned to certain stories to understand their importance to stakeholders and clients.

Step 2. Planning. Planning begins for the next release; it is based on team agreement through the planning game. The first plan creates a roadmap for what will be completed within a release period. Planning considers the relative value of each story and determines linearity and dependencies between tasks. This will also be completed at the weekly cycle level – each week the team will get together to understand what work will be completed during that week. The stories are broken into achievable tasks and allocated.

Step 3. Linking. Links are made within the planning phase, where considerations are made to ensure that the planned work and stories are designed in a simple and straightforward manner.

Step 4. Coding and development. This phase requires the implementation of the design through creation of outputs. Within this phase there is a need for continuous improvement, where ongoing feedback and support is included in future designs. This phase also includes the principles of continuous integration and pair programming.

Step 5. Testing. Within this phase the project team goes through testing each of the new requirements

developed. This ensures that the completed items meet the acceptance criteria and functionality checks established previously.

Step 6. Release. This requires handing over the completed components to the clients or users. These steps happen in cycles, and at both weekly and quarterly cycles the cycle will begin again.

Advantages of XP

There are advantages to applying XP project management, including:

- close working relationship with client
- avoiding unnecessary work
- stable outputs through continuous improvements and testing
- reducing errors through pair programming
- teams work at their own pace, with a focus on work–life balance
- flexibility in deliverables
- the code or supporting material is clear and easy to follow.

Disadvantages of XP

There are also disadvantages to applying XP project management, including:

- creation of additional work
- requires client participation
- requires large schedule or time investments
- usually costly
- version management can be complex
- self-discipline is necessary to practice XP properly.

In sum, XP project management requires ongoing management and understanding of client and customer requirements. The outputs of the project should be based on the specific customer needs and expectations, along with their ongoing feedback. Due to the flexible nature of these needs, XP includes continuous improvement. It has been defined as one of the most radical forms of agile project management and its application supports the project team to be creative, while also ensuring simple and straightforward designs.

Adaptive Project Framework

Adaptive project management (also referred to as Adaptive Project Framework or APF) is a structured approach. This project method requires the progressive improvements in decision-making processes, based

on feedback obtained from previous phases in the project (Shenhar and Dvir 2007; Wysocki 2010; Silber 2017). The entire project team, along with the project manager should learn from, adapt to, and accept changes as they arise. This is especially important as the client is key to APF – they are at the centre and as a result need to be involved in the end-to-end management of the project.

The focus of APF is adapting to changing requirements, environments, and client and stakeholder needs. This is a unique project methodology, based on systematic client controls over the project details (Shenhar and Dvir 2007; Wysocki 2010; Silber 2017).

How it differs from other methods

Within traditional and sequential project management, the techniques are clear, static, and straightforward. The plan for the project is broken down into tasks, resources, and activities. The project manager and the plan keep the project team and project on track. However, the changing environment, market conditions, client expectations, and technological advances (Shenhar and Dvir 2007; Wysocki 2010; Silber 2017) have impacted project management. Specifically:

> The way work is undertaken is constantly evolving, impacted by the advancement in technologies.
>
> Organisational strategies are becoming harder to develop, predict and adapt in response to changes in the market and environment.
>
> The management of people has also changed, requiring increased collaboration between team members, and changing working environments.

Adaptive project framework

- Cyclical planning.
- Tasks and resources scheduled to each cycle.
- Client involvement ongoing.
- Future state clear.
- Prioritisation of tasks early on.

Traditional Project Management

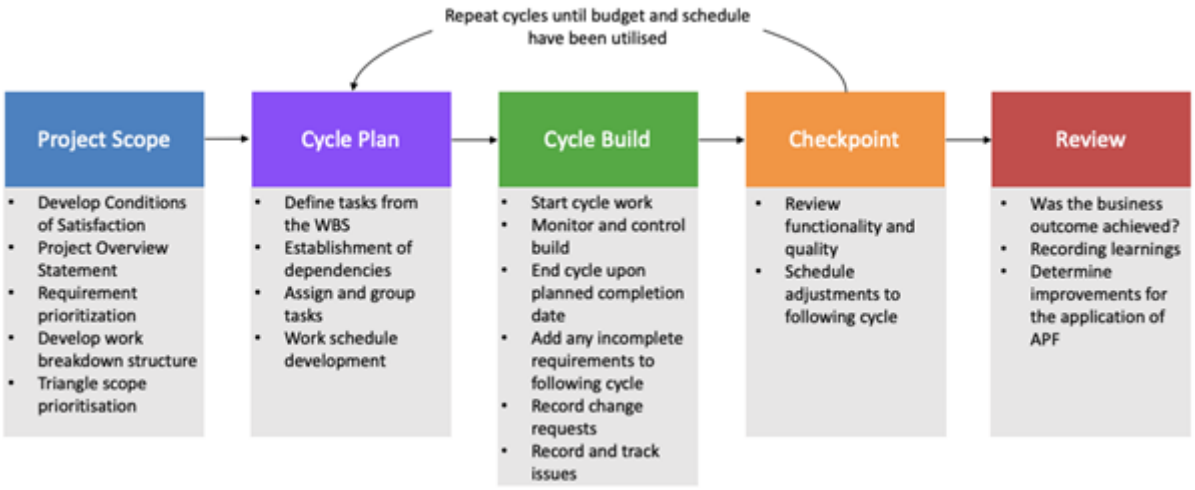
- Planning completed at the start.
- Resources and tasks scheduled early.
- Client communication at planned intervals.
- Fixed outcomes.
- Prioritisation per requirement.

APF is designed to support the adaptive work culture, encouraging team members to improvise when issues arise and respond to them appropriately.

APF phases

There are 5 key steps or phases within the APF. Although it is defined as an iterative or cyclical approach, there is a sense of linearity within it. However, within this linearity, there is an in-built cycle, allowing for reviews, improvements, and updates (Shenhar and Dvir 2007; Wysocki 2010; Silber 2017). The phases are outlined in Figure 22 and described below.

Figure 22. Phases of APF, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0



Phase 1: Project scope. At the start of any project the first and crucial step is to identify the objectives of the project. This step should also consider what the customer or client requirements are, and how the project will encourage collaboration between clients, the project team and key stakeholders (Shenhar and Dvir 2007; Wysocki 2010; Silber 2017). Within the project scope there are 5 key components:

- Conditions of Satisfaction (CoS). The CoS needs to be identified, with input from stakeholders and the project team. This document should outline the requirements, goals, and desired outcomes. Therefore, a clear CoS would provide details on how to take steps towards the desired outcomes, support communication of work underway and completed, and provide approval or stage gates to proceed to the next project phase or requirement.
- Project overview Statement (PoS). This should be the outcome of the CoS. The PoS should outline the approved CoS, which is endorsed by all stakeholders. The document should be used to help the project manager evaluate the project. Following the APF, the PoS will be updated when CoS changes are required.
- Requirement prioritisation. Collaboration between stakeholders and the project team is required to

create the end-to-end project scope. When prioritising requirements, there needs to be a clear order of tasks which support outcomes in a realistic manner. Consideration is needed to ensure that critical requirements or tasks are not missed and that the dependencies between tasks are documented.

- Work Breakdown Structure (WBS). Creating the WBS requires breaking down the different project requirements into tasks or activities which can be completed by an individual. Developing the WBS supports the estimation of budget and creation of schedule. Each task is allocated a duration, dependencies, sequencing, and resources to understand their criticality. The WBS is used to support conversations with stakeholders and set a baseline for the project progress.
- Scope triangle prioritisation. The final component of this phase is the evaluation of the scope triangle. The scope triangle is also referred to as the project management triangle or iron triangle (Atkinson 1999). The triangle is concerned with the constraints on quality, due to the impact of cost, scope, and schedule. Constraints identified within the evaluation are classified as adaptable, inflexible, or trade-off-possible.

    Adaptable constraints can be changed or evolve to meet changing needs through negotiation.

    Inflexible constraints are crucial and have no negotiation or room to change.

    Trade-off-possible can be used to compensate for other constraints if or when issues or changes arise.

Phase 2: Cycle Schedule. As there is now clarity around the project scope, the end-to-end project is broken down into iterations/cycles (or mini projects). These iterations are planned according to their complexity, length, number of tasks and available resources. The cycle aims to produce deliverables (one or two) (Shenhar and Dvir 2007; Silber 2017; Wysocki 2010). There are 4 primary steps that should be followed to create the schedule:

1. Tasks within the WBS need to be defined

Activities that are required to be completed during the cycle need to be identified from the overarching WBS. The tasks should not exceed the planned cycle duration. Where there are too many tasks , those non-critical items should be move to the next future cycle.

2. Task dependencies outlined

Through the WBS for the cycle, the dependencies should be identified and documented. This could follow the Critical Path Method or network diagrams to highlight task sequences. The dependencies should highlight critical tasks, along with resources required to complete tasks.

3. Tasks are grouped and assigned to project team members

Tasks should be assigned to a team member or group of members, based on the cycle's WBS and dependencies. Where dependencies between tasks exist, there should be close working relationships between project team members responsible for their outcomes.

4. Effective work schedule is created

A timeline should be mapped and provide a view of the entire cycle and the tasks allocated to specific team members and groups. The schedule needs to provide details of the duration, resources, dependencies, assumptions, constraints, budget, and quality expectations. The schedule created should only include work that is achievable within the cycle's allocated duration.

The project goal needs to remain in focus, priority towards tasks should be determined early, deadlines need to be set and linked to the dependencies.

Phase 3: Cycle build. Complete the work required within the iteration. Tasks are completed by team members based on their allocation, cycles are adjusted as required, and pending tasks can be moved or changed based on cycle needs (Shenhar and Dvir 2007; Silber 2017; Wysocki 2010). Cycle build requires following the plan set out in the schedule. This includes:

- undertaking agreed upon and scheduled work
- monitoring and controlling progress and adjusting as required
- completing the cycle at the scheduled date
- reallocating pending tasks or uncompleted tasks to the following cycle
- documenting feedback and considering improvements
- tracking problems and implementing solutions.

Supporting activities within the cycle build phase include:

- Developing a detailed schedule. This detailed schedule should outline the roles, responsibilities and work required of each individual project team member. There is no set format for how this is documented, it can be a to-do list or a formalised process.
- Critical tasks should have a clear path to completion. This will support succession planning in case of unexpected absences or planned leave, enabling work to continue.
- An issues register should document any issues or problems faced during a cycle. The register should include what the issue was, who raised it, who resolved it and how.
- A scope bank should be created for each cycle to document any potential changes required or tasks incomplete at the end of the cycle. This will enable the team to carry them over to the following cycle.
- Daily team meetings should be held to share progress updates, potential blockers, and the need for support and next steps.

Within the cycle build, where a deliverable is incomplete in a cycle the tasks are carried over to future cycles. The improvement or process changes are responded to within the process, and as a result communication with stakeholders is required throughout. Within the cycle build phase it is important to remember never to extend the cycle's duration and not make changes during the cycle.

Phase 4: Client checkpoint. This is a vital step in the APF. Within this phase, feedback is provided by stakeholders around what was delivered in the previous cycle build. The client is given time and the opportunity to review the quality and functionality of the deliverable and provide improvements or feedback (Shenhar and Dvir 2007; Wysocki 2010; Silber 2017).

Through the completed analysis, project managers liaise with the clients and stakeholders to adjust the upcoming schedule or deliverables as needed. Where adjustments are made, any changes are documented and consideration is given to how quality will be assessed.

There is a cyclical relationship between phases 2, 3 and 4. These phases continue to repeat as part of a process, where the project manager and team update the plan/schedule, which impacts the cycle build and the review cycle. The cycles continue until the scheduled end date or the project is completed (whichever comes first). An overview of the requirements of phases 2 to 4 are outlined in Figure 23.

Figure 23. Phases 2 to 4 cyclical overview, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0

Phase 5: Final report. This report is used to evaluate the success of the project. This is a collaborative effort between the project team, stakeholders, and client (Shenhar and Dvir 2007; Wysocki 2010; Silber 2017), whereby all the potential successes and failures are documented, improvements are considered and experiences are shared. The final report should support future projects.

Benefits to APF

There are benefits documented to support applying APF, including:

- Client-focused: the project team aim is to deliver outcomes based on the needs outlined by the client, based on the documented scope.
- Client-driven: clients are included at each phase; they are meaningfully involved throughout and support the changes and progress.
- Change-focused: adapting to changes quickly is important, especially when they impact the solution or outcomes provided.
- Prioritisation of requirements: through the prioritisation of the different requirements, those key activities or tasks have been identified and can be completed. Whereas tasks deemed not critical can be held until time permits.
- Continuous feedback: open communication is crucial, and stakeholders, clients, and project team members can all provide feedback. This supports the delivery of results.

Disadvantages to APF

There are some potential disadvantages to applying APF, including:

- Ambiguity in process due to flexibility: unclear scope or tasks can cause issues in the planning, as not every detail has to be known as part of APF. Projects can fail due to the lack of clarity associated with the overarching end state.
- Following cycles causes difficulties. As cycles are not flexible, change requests need to wait to be completed until the following cycle. This wait time can cause frustration for clients and stakeholders who want to see results sooner.
- Scope creep occurs often. As there is no specific path to the completion of the project, there is an opportunity for scope creep. There is a risk of the budget running out before the requirements are completed, therefore APF requires a strong and experienced project manager to manage expectations.

When to use APF

There are certain situations where using APF may be appropriate for a project, most commonly when the project has a specific goal or outcome with no specific solution in mind. However, there is also a need for the project organisation and clients to meet certain characteristics. It must:

- be responsive and adaptive to change
- be innovative and willing to experiment
- encourage failure to spur iterative improvements.

In sum, APF is a non-traditional project management methodology that encourages ongoing change throughout. Using APF requires putting the client at the centre or focus of the project work, encouraging their feedback and input, making updates or iterative improvements as asked and learning from experience. It is a cyclical approach that requires planning at each iteration and heavily involves stakeholders and clients throughout. It can be a challenging form of project management to implement without experience, and it requires ongoing monitoring and controlling to support the achievement of outcomes.

Key Takeaways

- XP project management requires ongoing management and understanding of client and customer requirements.
- The outputs of the XP project should be based on the specific customer needs and expectations, along with their ongoing feedback.
- Adaptive project management is also referred to as Adaptive Project Framework.
- In APF, clients are included at each phase; they are meaningfully involved throughout and support the changes and progress. The project manager needs to ensure client availability during the life cycle of the project.
- APF is a non-traditional project management methodology which encourages ongoing change throughout. Before adopting this approach, we suggest you consult the organisation strategy and the organisation's support to change it.

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7.

A BROADER PICTURE: OTHER METHODOLOGIES

Outside the traditional, sequential, process-based, uncertainty and agile project management methods there are also other methods which do not fit within these categories. Although they may share some characteristics common to other methodological categories, they have a fundamental difference. This module will discuss PRiSM and Benefits Realisation project management methods.

Learning Outcomes

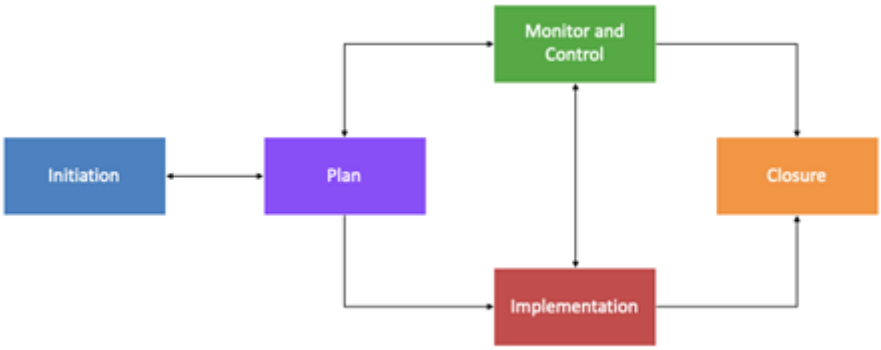
- Articulate the importance of a sustainable project base methodology.
- Evaluate the Six Principles of PRiSM.
- Assess the key phases of the Benefit Realisation Project Management Method life cycle.

PRiSM

PRiSM is a sustainable principles-based project management methodology. The focus of this method is the value-maximisation model which determines the total asset life cycle. PRiSM ensures that an organisation leverages its existing structure so that benefits include horizontal and vertical improvements, including a significant requirement for sustainability (Madhavji and Schafer 1991; GPM 2013, 2019; Carboni et al. 2018).

This method is defined as a green project methodology, which is based on the P5 Standard for Sustainability in Project Management (P5). P5 enables organisations to understand the impact of their projects (Madhavji and Schafer 1991; GPM 2013, 2019; Carboni et al. 2018). PRiSM supports a reduction in risk within a project from multiple perspectives (including environmental, social, cultural, and economic). Additional benefits can also be identified and realised. PRiSM follows the traditional project management life cycle and is comprised of 5 phases (as outlined in Figure 24).

Figure 24. Phases of project management, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0



These phases are (PMI, 2019):

Phase 1. Initiation. This phase involves establishing the project; the objectives and goals of the project are determined in this phase. Within this phase the approval is sought to start the project through the creation of the project charter. Documents required during this phase:

- project charter
- feasibility study
- business case
- resources.

Phase 2. Planning. This phase involves planning and designing the end-to-end project, including establishing a project management plan which outlines:

- project scope
- deliverables
- objectives
- dependencies
- assumptions and constraints
- work breakdown structure
- stakeholder register and communication plan
- budget
- schedule
- resources
- risks and issues.

The planning phase develops a roadmap to support the implementation of the project deliverables.

Phase 3. Implementation. This phase puts the project plan into action. Within this phase the project team needs to be managed, and the outputs measured against the baseline scope, cost, and schedule. Stakeholder engagement and quality management are key within this phase.

Phase 4. Monitoring and controlling. This phase requires tracking the actual progress of the project compared to the plan, and where implementing corrective actions are needed.

Phase 5. Closure. This phase requires the formal closure of the project, securing sign-off or approval from the clients, stakeholders, and sponsors. The process often includes:

- project delivery
- reflection
- archiving project documentation
- releasing the team.

In addition to these phases, project planning and implementation needs to incorporate adopting the services and products being provided, along with integrating them into business as usual and supporting benefit realisation.

Six Principles of PRiSM

The 6 principles of PRiSM have been derived from the United Nations Global Compact's Ten Principles, Earth Charter, and ISO:26000, Guidance on Corporate Social Responsibility (UN 2010). These principles are outlined in Figure 25 (Madhavji and Schafer 1991; GPM 2013, 2019; Carboni et al. 2018):

Figure 25. PRiSM principles, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0

1. Commitment and accountability. This principle outlines the importance of the rights of all individuals to a clean, healthy, and safe environment, along with equal access to opportunities, ethical suppliers, following rules of law and fair remuneration.
2. Ethics and decision-making. Organisational ethics should support decision-making regarding principles identifying, mitigating, and preventing any adverse long-term or short-term environmental or societal impacts.
3. Integrated and transparent. All aspects of governance, practice and reporting within an organisation need to consider the interdependence between environmental protection, economic development, and social integrity.
4. Principle and values-based. This principle encourages improving the use and development of resources and technologies to preserve and enhance natural resources.
5. Social and ecological equity. Demographic research and data analytics can help support organisations to understand various levels of human vulnerability and ecologically sensitive areas.
6. Economic prosperity. Organisations should establish combined objectives and financial strategies which balance the needs required to support stakeholders and shareholders, along with the long-term needs of the organisation and future generations.

Through the application of PRiSM, organisations can use a principles-based approach to support sustainability.

Key characteristics of PRiSM

Within PRiSM there are 4 key characteristics:

1. Ingrained social and environmental project objectives. Through incorporating social and environmental objectives as part of each project, organisations are better prepared to track, monitor, and control their sustainability activities (GPM 2013, 2019). This helps organisations to identify key areas for improvements, while also providing increased levels of accountability and transparency for their sustainability goals.

2. Defined Sustainability Management Plan. Using PRiSM, every project requires a Sustainability Management Plan (SMP), which is used to outline how the above objectives will be met. The SMP defines the plan and monitors outcomes, ensuring strategic alignment of the activities (GPM 2013, 2019; Carboni et al. 2018). The SMP includes:

- introduction/executive summary
- sustainability objectives
- performance indicators
- roles and responsibilities
- activities and tasks
- environmental impact assessment

- risk management
- sustainability metrics.

3. Undertaking impact analysis. An impact analysis is a necessary component of all PRiSM projects. It outlines the objectives, what will be measured, and the impact on the P5 elements (People, Planet, Prosperity, Processes, and Products). The analysis looks at the end-to-end project, ensuring all activities, including changes and maintenance, are considered (Madhavji and Schafer 1991; GPM 2013 2019; Carboni et al. 2018). This assesses, evaluates, and encourages the improvement of all tasks and activities within the project to support equality, diversity, environmental sustainability, etc.

4. Using Green Vendor Scorecards. External contracts are just as important as internal processes – there needs to be an alignment with the organisation's sustainability objectives and strategies. Using a Green Vendor Scorecard supports organisations to assess and evaluate the sustainability strategies of an organisation (GPM 2013, 2019). The criteria included within the scorecards can meet the needs and requirements of the organisation and project. They can use both qualitative and quantitative evaluation metrics.

PRiSM Pros

There are several advantages to using the PRiSM method to support green project management, including:

- reduction of environmental and social impacts
- ensuring sustainability measures are implemented
- specific plans outlining how to implement
- stakeholder and organisational accountability and transparency.

PRiSM Cons

Although there are many positives to using PRiSM, there are some disadvantages to the method, including:

- ongoing organisational collaboration, transparency, and support
- requires strategic alignment at all levels
- often requires a considerable number of resources
- financially intensive
- requires detailed and in-depth monitoring and controlling.

In sum, PRiSM project management is a green principles-based approach. The approach focuses on incorporating both social and environmental objectives into each project completed. This encourages organisations to monitor and control their activities and progress towards sustainability. Within a project,

applying PRiSM can support the identification of key improvements and next steps in the organisation's sustainability.

Benefits Realisation: delivering the benefits the customer expects

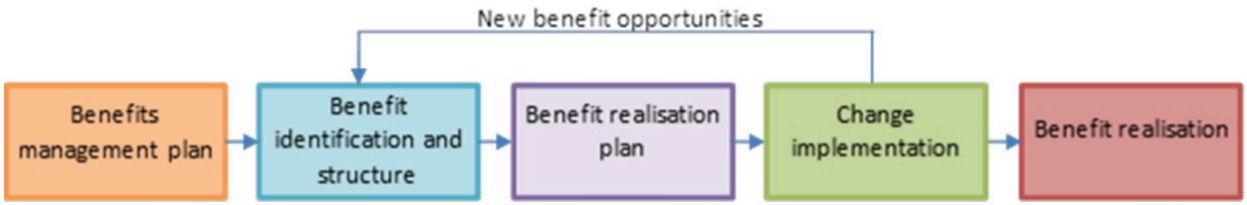
The Benefit Realisation project management method is an approach used to identify, implement, and measure benefits. The approach requires the project to define and implement the expected benefits early and ensure that they are represented in the outcomes (Melton et al. 2011; Sopko and Demaria 2013; Zwikael and Chih 2014; PMI 2019). Benefits Realisation can be used to support project management (as a tool) or as a standalone methodology.

To achieve the desired benefits during the project, Benefits Realisation management needs to be considered or documented as an additional component or activity within the project plan. This activity is used to determine how requirements and deliverables can be measured as benefits (Melton et al 2011; Sopko and Demaria 2013; Zwikael and Chih 2014; PMI 2019). To identify a benefit, it needs to be tangible. Benefits need to be transitioned into use and benefits realisation should be identified and supported by the sponsor.

Benefit Realisation management for organisational improvement

Organisations can apply Benefit Realisation management to the broader organisation or business as required, without implementing a project (Melton et al. 2011; PMI 2019). There are 5 steps within the Benefit Realisation management process, outlined in Figure 26 and documented in detail below.

Figure 26. Benefits Realisation management 5-step process for organisational improvement, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0



Step 1. Benefit realisation management plan

This step involves developing an overarching plan for how to implement Benefit Realisation management within an organisation. Due to the cyclical nature of the following 3 steps, the management plan needs to provide a clear structure on how to implement Benefit Realisation management. This will include:

- stakeholder communication and engagement plan
- measurement and evaluation requirements
- identification processes
- benchmarking estimates and baseline levels
- overview of the approach used within the organisation.

Step 2. Benefit identification and structure

This step involves identifying the benefits and structure provided for their implementation. Identification requires a description of the benefits, the key steps required to implement, primary stakeholders, the baseline current state, and benchmarking the future goal state where possible.

Step 3. Benefit realisation plan

This step documents the realisation plan process, whereby each benefit identified will be outlined in detail, including:

- schedule or timeline
- the change to be implemented

- budget
- roles and responsibilities
- how the change will be implemented
- key tasks, activities, documents, and steps
- risks and issues
- metrics (for example, baselines and benchmarks)
- quality assurance process
- review periods.

Step 4. Change implementation

This step involves implementing the plan created in Step 3. The process of implementation includes:

- completion of tasks, activities, documentation, and steps
- status reporting (schedule, budget, scope, quality, and benefits)
- team performance measurement
- risk register completion (intervention when needed)
- quality assurance.

Cycle back when new benefit opportunities are identified.

Step 5. Benefit realisation

This step involves the realisation or achievement of the identified benefits as outlined within the plan. Evaluation occurs post change implementation, which is used to support the organisation's understanding of the outcomes achieved.

Benefit Realisation management life cycle

Within the Benefit Realisation management life cycle there are 6 phases. These are outlined in Figure 27 and detailed below.

Figure 27. Benefit Realisation management life cycle, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0

Phase 1. Identify and quantify

Phase 1 is the initial gathering of information and the identification of the different benefits (PMI 2019; Melton et al 2011; Sopko and Demaria 2013). This requires assessing the proposed project deliverables to understand key areas of interest or benefits. Questions include:

- What is the project aiming to achieve?
- What is the desired end state?
- What is the current situation?
- How does this work align with the organisational strategic objectives?
- Who are the stakeholders? How can we engage with them to support the Benefit Realisation management process?

After answering these questions, 2 key documents need to be created (PMI 2019):

- Benefit profiles: this is the documentation and description of each benefit, how they relate to one another and what project deliverable they will be achieved through. Each profile should include:

  a unique project identifier
  title of the benefit
  detailed benefit description
  owner of the benefit

timeline for implementation
measures for success or failure
risks associated with the benefit or deliverable
key deliverables.

- Benefit maps: this is the documentation of the different benefits and how they link to specific deliverables, changes, and each other. They are created in collaboration with business stakeholders and are used to support understanding of critical deliverables or tasks within the project. These maps should be sequential and built upon in phases 2 and 3.

Phase 2. Value and appraise

Phase 2 can be completed as part of phase 1; however, the purpose of this phase is to understand in detail the different benefits and their relationships to one another, business, strategies, and deliverables within the project (PMI 2019). Within this phase, 4 key tasks need to be undertaken:

- Business case. This should outline in detail the components of the deliverable and the benefits which link to it. It should be specific, in terms of how measurement will occur, looking at what the current state is and how the deliverable will achieve the desired end state (or support it).
- Baseline measures. This is the documentation of what the current state is and what will be used to measure the changes/deliverables and benefits.
- Benefit targets or benchmarks. This is the development of targets or benchmarks for the benefits to achieve. These need to be specific, measurable, tangible, realistic and timely. These benchmarks need to link back to the baseline measures.
- Stakeholder consultation. Use stakeholder consultation to understand the current needs and expectations of stakeholders. Analysis should be conducted to explore the impact of changes to stakeholders.

These tasks are often documented within an overarching benefits framework document. This document provides an overview of the benefits to be achieved within the project. It outlines standards, definitions, descriptions, and an overall plan for management (PMI 2019). Key components include:

- benefit maps
- measurement and evaluation rules, guidelines, and methods
- business case
- baseline measures and targets for benefits
- type or category of benefits
- stakeholder register
- risk register.

Phase 3. Planning

Phase 3 involves planning how the benefits, changes or deliverables will be achieved within the project. This phase is closely linked to the documentation completed in phases 1 and 2, as planning will be completed on those benefits previously identified (PMI 2019; Melton et al 2011; Sopko and Demaria 2013). Additionally, the planning phase should outline the benefits in relation to specific outcomes or deliverables, establish accountable and responsible parties for benefits, and specific timeframes/schedules (PMI 2019). Key documents within this phase include:

- Benefits realisation plan: used to outline the benefits and arrangements to justify and achieve the benefits, this document includes:

    schedule or timeline for benefit realisation
    management of resources
    risk management
    change management
    reporting requirements
    target and forecasted improvements.

- Benefit management plan: overarching document used to set out the approach, methods, processes, and policies used to support the implementation of project benefits. This document includes:

    benefit identification process
    definitions of benefit types or categories
    roles and responsibilities
    definitions of benefits, measures, and approaches
    benefit mapping techniques and approaches
    policies
    deliverables.

- Visibility process: this process involves sharing the overarching project vision or goals, to provide clarity and understanding to stakeholders, project team members, and clients as to why the project is occurring.

Phase 4. Realisation phase or execution phase

This phase involves monitoring, controlling, tracking, and reporting the plan. The realisation phase is based on implementing changes, completing tasks and activities, and tracking against the plan to optimise benefits. Additionally, this phase supports the benefit evaluation (PMI 2019; Melton et al 2011; Sopko and Demaria 2013).

To achieve benefits realisation, in phase 3 projects need to have documented planning the ownership of

each benefit. This provides an understanding of who will be responsible for what component (PMI 2019; Melton et al 2011; Sopko and Demaria 2013).

During this phase, the benefit realisation management plan will be implemented. The activities within the plan often include:

- achieving benchmarks outlined with the plan
- completing an organisational capability assessment, planning improvements to capability development and implementing these improvements
- knowledge sharing
- building in ongoing training and support mechanisms.

Phase 5. Review results or monitoring and controlling

This phase supports the execution phase (phase 4), by focusing on the quality of the outcomes achieved. Additionally, the phase enables monitoring how the outcomes are tracking compared to the baseline (PMI 2019). Within this phase, change and risk management are addressed:

- Change management: process for implementing changes that arise during the execution phase. The change management process includes:
  - Change management register, outlining: change description, date of change, impacts of change (schedule, scope, budget, quality, benefits), approver, and approval documented.
  - Baseline refreshment in response to the changes approved within the register.
  - Status updates which reflect the progress to plan and changes that occurred.

- Risk and issues management: used to respond to risks and issues as they arise.
  - The risk register outlines:

    risk description
    impact and influence rating
    risk rating
    mitigation strategy
    date of risk
    category
    person who identified risk
    impacts.

Phase 6. Review or closure

This phase is the conclusion of the project, where all the benefit realisation components are transitioned back to the business-as-usual teams (where required). Within phase 6 there needs to be a focus on capability

development in the business areas taking over the work, and documentation of lessons learned during the application of the Benefit Realisation management process (PMI 2019).

Documentation used within phase 6 includes:

- Handover document: this document should outline what business as usual areas need to do to maintain the benefit realisation post project. The document should outline who is responsible for what component and the frequency of reviews.
- Closure document: where handover is not required, a closure document is used to finalise the project. The document will call out benefits realised, deliverables provided and where these live within the business as usual. Review periods will be allocated post closure to ensure the process is followed and maintained.
- Evaluation of benefits: this evaluation will assess the benefits as they were identified and documented in the initial phases, in comparison to what was implemented. Any additional benefits which were identified throughout the project will be evaluated in the same manner. The document should be shared with stakeholders and clients to highlight the outcomes of the project.
- Register of benefits: a central register used to document all the benefits within the project. Where benefit realisation management is applied more broadly, these benefits can be added to the overarching organisational benefit repository.
- Lessoned learned register: documentation of what worked and what did not work during the project. This should include the recommended mitigation strategies.

Benefits realisation management compared to traditional project management life cycle

Table 6. Benefits realisation management compared to traditional project management life cycle

	Phase 1	**Phase 2**	**Phase 3**	**Phase 4**	**Phase 5**
Traditional Project management	• Initiation	• Planning and design	• Execution of project management plan	• Monitor and control	• Closure
Benefits Realisation management	• Benefit Identification • Value and appraise	• Plan benefits	• Execution of benefits management plan	• Monitor and optimise	• Realise and evaluate

Table 6 outlines the similarities between the phases across the Benefits Realisation management and traditional project management approaches. This also highlights how these two approaches can be used simultaneously. As outlined in Figure 27, there are 6 phases commonly found within Benefit Realisation management; however, the benefit identification and value and appraisal phases (phases 1 and 2) can be

combined. Therefore, Benefit Realisation management can be used as a project management approach in isolation, or it can be supported by traditional project management.

Advantages

There are some advantages to applying Benefits Realisation management to projects, including:

- The organisation works towards a common objective, and the goals are set and shared across the organisation. This level of transparency helps team members work towards these shared outcomes.
- Accountability is established for each benefit. There is a responsible and accountable person attributed to each benefit within the project. As a result, it is clear who will drive deliverables and outcomes associated with it.
- Business case and project documents are living. These documents are updated as required, and updates can respond to market conditions, organisational requirements, or technology innovations.
- Change is encouraged. As the documentation is living, change during the projects to increase benefit realisation is encouraged.
- Benefits are agreed upon collaboratively. All project team members, clients and stakeholders are involved in the identification and prioritisation of benefits.

Disadvantages

There are some disadvantages to applying Benefits Realisation, including:

- There is no defined governance around benefits. There can be complexities associated with the level of governance required to record and report on the progress of benefit realisation. This can make the process difficult to follow.
- Benefits are not standard or comparable. There is no standardised process for identifying or implementing benefits, and this makes it challenging to progress.
- Accountability for benefits is misplaced. Although accountability is established early on for each benefit, when people move roles or portfolios, there can be a disconnect between who is responsible for which benefit.
- Benefits are not verifiable. Not all benefits created can be measured. Where they are not tangible, they can be difficult to implement and follow.
- Scope creep. Due to the encouragement of change, scope creep happens quickly and often. A good project manager is required to maintain momentum, encourage change while also keeping the scope on track.

In summary, Benefit Realisation management is a process which involves identifying, planning, measuring, and tracking the benefits within a project. These benefits form key parts of the project's deliverables or outcomes. The aim of the approach is to implement specific, measurable, achievable, realistic, and timely

benefits. Due to the focus on benefits within this project management approach, decision-makers and project managers are better able to allocate resources, determine criticality of tasks and deliverables, and achieve outcomes.

Test your knowledge

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://jcu.pressbooks.pub/pmmethods/?p=149#h5p-17

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://jcu.pressbooks.pub/pmmethods/?p=149#h5p-18

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://jcu.pressbooks.pub/pmmethods/?p=149#h5p-19

Key Takeaways

- PRiSM ensures that an organisation leverages its existing structure, and that benefits include horizontal and vertical improvements, including a significant requirement for sustainability.
- PRiSM is defined as a green project methodology.
- Within a project, applying PRiSM can support the identification of key improvements and

next steps in the sustainability of the organisation.

- The Benefit Realisation project management method is an approach used to identify, implement, and measure benefits.
- Organisations can apply Benefit Realisation management to the broader organisation or business as required, without implementing a project.
- Accountability established for each benefit is one of the key benefits of Benefit Realisation project management method.

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8.

SOFT SYSTEMS METHODOLOGY

This module will explore a systems approach to integrating all the different components within the project environment, to create a comprehensive approach to solving the problem.

Learning Outcomes

- Contextualise systems as a 'Wholistic' project management method approach.
- Compose the requirements for a Systems Lens application.
- Formulate Soft Systems Methodology frameworks.

Background

Broadly speaking, a systems approach is used to create an understanding of the interrelationships between different components within the environment, the project, and the stakeholders. Through a generalisation of the different components, the project team is better able to understand the interdependent nature of the factors (Cleland 1997; Meredith and Mantel 2011; Kerzner 2017). Additionally, the systems approach allows the project team to understand the situation in its entirety, including resources, materials, market conditions, organisational needs, stakeholders and so forth. By understanding these factors, the project is better able to meet the project objectives and keep the end-state in mind throughout, to ensure that the approach is the most efficient and effective process possible.

This is a disciplined way to view the environment and identify potential solutions to problems while being open to opportunities. These opportunities can be realised through understanding that everything is related to everything else in the environment or organisation.

A system is a composition of numerous related and dependent components which, through interactions with one another, create a whole. Therefore, a system is a compilation of distinct factors or components which form a complex whole. Although this definition is general, a key element of a system is how the collection of factors or components come together to produce an outcome (INCOSE 2015). This outcome is not attainable by the individual elements – an outcome can only be created through the interactions between and across the components and factors.

By applying a systems approach to project management, the view of the project changes from a set of tasks and activities to a combination of sub-systems which work together to make a broader system (Cleland

1997; Meredith and Mantel 2011; Kerzner 2017). The broader system's effectiveness and performance is impacted by the corresponding performance of the sub-systems of which it is comprised. Therefore, by viewing the project management process as a system which operates as an entity comprised of sub-systems, project managers can identify areas within the project which could lead to success or failure. However, the sub-systems which comprise the project are not limited to internal factors within the organisation – external components or factors play a significant role within the systems approach.

Through a systems approach, a project manager, project team and the broader project organisation are empowered to consider the impacts of the environment when implementing changes or projects. The context surrounding the project should be established at the outset as this will provide a viewpoint of the system. This viewpoint will support decision-making throughout the project, encourage realignment of resources as needed and trigger changes in response to the environment.

Considerations

Before a project manager considers applying a systems approach (Cleland 1997; Meredith and Mantel 2011; Kerzner 2017), there are several components which need to be considered:

- How all tasks, activities, processes, and deliverables within the project depend on one another needs to be documented. However, consideration is needed to understand the properties of the individual components outside of their dependencies.
- Project goals need to be clear; each component of the project should be working towards those goals.
- Resources supporting the project should be consistent throughout. Where additional resources are required, the impacts on the outcome need to be considered. This includes impact on quality, scope, budget, and schedule.
- Uncertainty is expected within a project. Consideration is required to provide support in managing and responding to uncertainty as it arises (for example, risk and issues management processes).
- Resources should be allocated roles and responsibilities based on their skills and experience. These resources can work together as part of a sub-project team, to support the development of different deliverables. For each deliverable, a different approach may be required to manage the needs and complexities.
- Visualisation can be used to support documenting the complexities.

Through a systems approach, project managers are supported to ensure they are aiming for the project's goals and objectives.

Let's watch the following video by Systems Innovations which explains the primary differences between analytical methods of reasoning and systems thinking

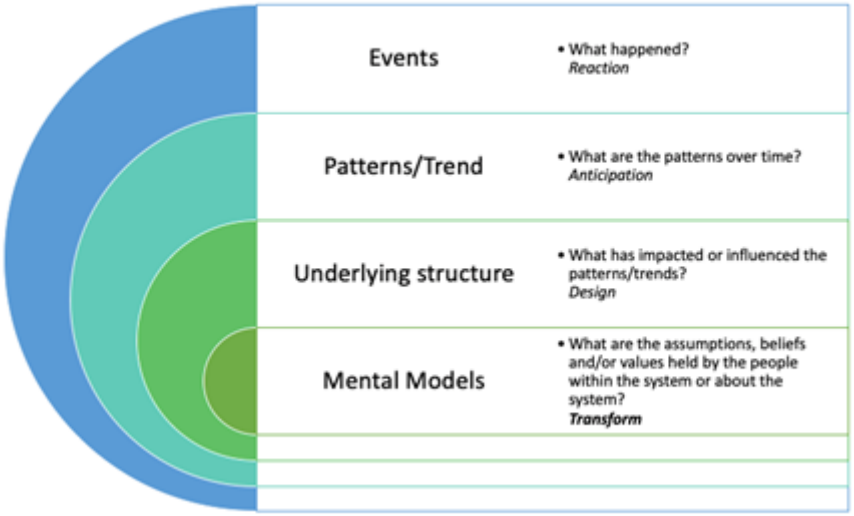
Video [5 mins, 41 sec] **Note:** Closed captions are available by selecting the CC button in the video below.

https://jcu.pressbooks.pub/pmmethods/?p=155#h5p-15

How to apply a systems approach

In addition to using traditional project management methodologies, the systems approach can be used to effectively manage a project. Based on systems theory, there are 4 primary tools and principles which can be applied from the Systems Thinking Iceberg, recreated in Figure 28.

Figure 28. Systems Thinking Iceberg, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0



Based on Figure 28, below are 4 principles and tools which can be applied to projects to support the systems approach to project management (Cleland 1997; Meredith and Mantel 2011; Kerzner 2017).

- **Events**. This level seeks to understand what is known, and what are the causes, triggers, and side-effects if a problem occurs. Not all projects are created equally, and as a result not every problem can be resolved or understood easily. Therefore, a thorough exploration and analysis is required to delve into the deeper patterns/trends, the underlying structure, and the mental models (Cleland 1997;

Meredith and Mantel 2011; Kerzner 2017;). To achieve this, the project team needs to document:

- a detailed problem statement
- triggers, causes and side-effects
- the reactions of the different stakeholders
- links between problems and solutions previously attempted.

- **Trends and patterns of behaviour**. Based on what was outlined in the events analysis, the project team needs to consider which different trends or patterns are associated with the problem (Cleland 1997; Meredith and Mantel 2011; Kerzner 2017). This includes:
  - when it occurs (frequency)
  - who has been impacted
  - steps taken to rectify
  - interactions between the event and other factors or events
  - identifying potential causes
  - testing potential solutions.
- **Underlying structure**. Determining the current system structure (Cleland 1997; Meredith and Mantel 2011; Kerzner 2017), the project team needs to consider:
  - environmental elements within the system
  - causes of the behavioural patterns
  - stakeholders within the system
  - underlying interactions between stakeholders, environment, and causes.
- **Mental models**. This is a consideration of the underlying assumptions, beliefs, expectations, and values within the system structure (Cleland 1997; Meredith and Mantel 2011; Kerzner 2017). This requires the project team to understand:
  - what supports the underlying structure
  - the values, expectations, and beliefs within the system and broader environment
  - how the problem is understood
  - the proposed solutions and how will they be implemented and analysed.

Systems approaches can be applied through a cyclical method which considers the relationships between each component of a project phase. See Figure 29 for examples.

Figure 29. Examples of the cyclical approach that can be used to support systems approaches to project management, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0

By applying the systems approach, organisations can understand the interactions between different areas, documents, and tasks and activities. By using a systems approach:

- Project managers are able to realise the need for a holistic approach to prepare, plan, and implement a project.
- The multidimensional components which have an impact on the outcomes of a project (for example, technological, financial, resources, cultural, etc.) can be documented.
- Project managers can understand how different dimensions or structural components will influence the stakeholders and their expectations, and how the market and environment can change swiftly and significantly. This is commonly in response to economic factors, ecological issues, stakeholder values, news cycles and so forth.
- The end-to-end interactions between tasks, activities, resources, stakeholders and so on, are considered and work together to reach the common goals and objectives of the broader system (or the project).

Therefore, when the systems approach is applied to a project, project managers are better able to respond to the conditions outside of their control, and create efficiencies within their projects boundaries to maximise outcomes.

Soft Systems Method

Soft Systems Methodology (SSM) is an approach which is used to create structure in complex problems

and develop changes which are both feasible for and wanted by all the stakeholders. These stakeholders include internal stakeholders (employees, developers) and external stakeholders (users, clients, competitors). As a result, everyone provides different insights into and solutions to solve a problem (Checkland and Scholes 1990; Checkland 2000; Checkland and Poulter 2006).

To support the understanding of SSM, a soft system can be defined as a human activity system (HAS). This HAS is purposeful and organised in that groups of people work collectively to achieve a purpose or outcome.

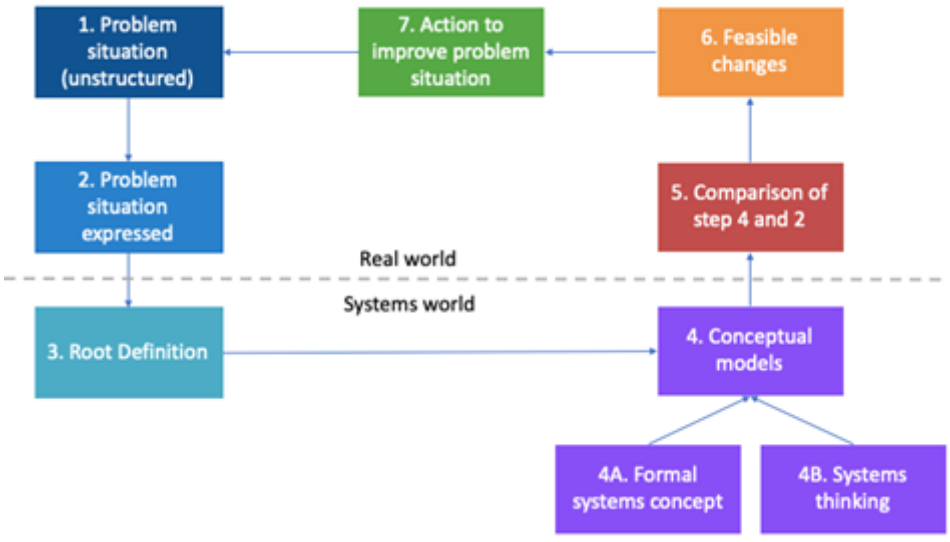
SSM was designed to allow each heterogeneous group of stakeholders the opportunity to provide their insights into the problem. Each group or stakeholder can document the problem in their own way and provide their insights into feasible or desirable outcomes or solutions (Checkland 2000).

Through collaboration, a solution can be created that is agreed upon by all stakeholders. It supports quicker decision-making through consensus. The approach is used to show the links between the real world and the considerations and components documented within the systems world.

The 7 steps to SSM

There are 7 steps to SSM (see Figure 30). These steps are not necessarily carried out in linear order and some steps may not need to be completed. These steps should be used to support collaboration, decision-making and problem-solving.

Figure 30. SSM 7 steps, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0



Step 1. Identify the problem situation

This step involves gathering relevant information to understand the problem situation. There are several tools which can be used to support information gathering (Checkland and Scholes 1990; Checkland 2000; Checkland and Poulter 2006), including:

- interviews
- surveys
- brainstorming sessions
- historical and current data
- news articles
- document analysis
- organisational structure
- control policies
- observation sessions.

Through the information gathered, analysis should support understanding the possible components and factors which could influence or impact the problem situation.

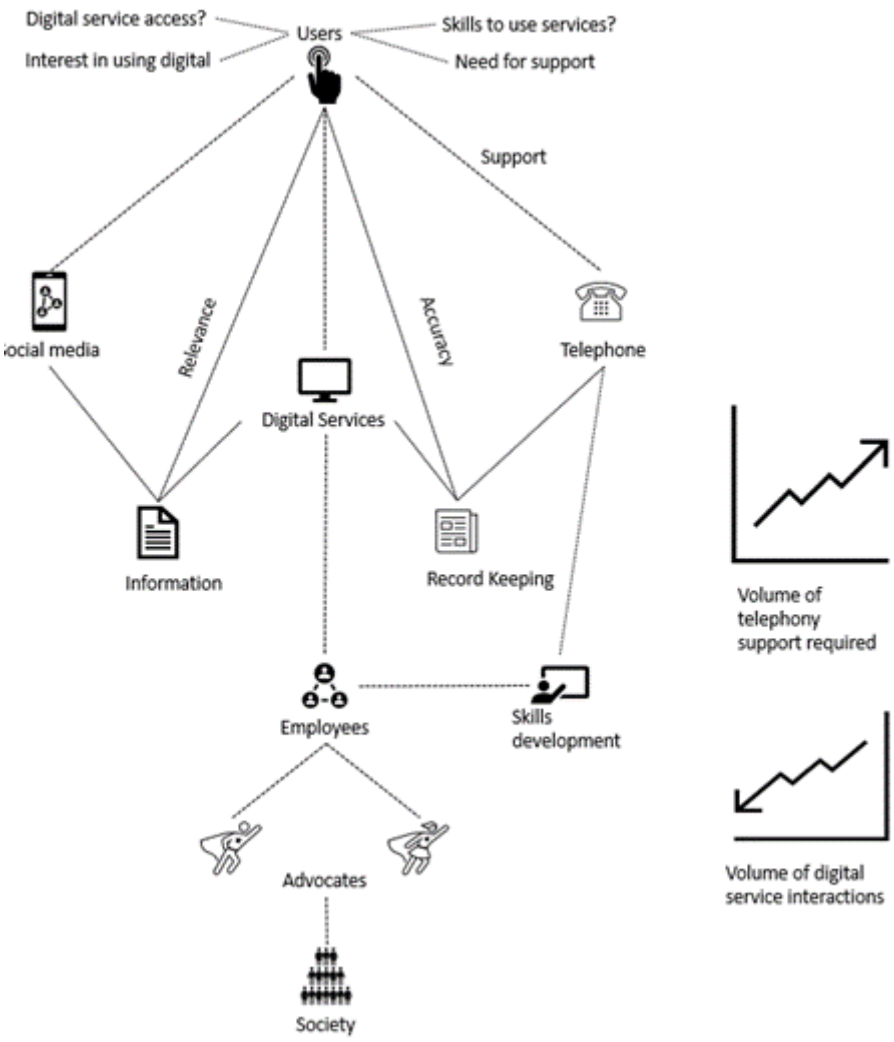
Let's go through the rest of the steps using a sample organisation: Lugano. Lugano is a financial firm that offers digital services to clients. This organisation is experiencing decreased overall use of digital services and significant increases in the need for support provided by frontline employees by telephone. It is unclear what is causing this increased need for support. Information is gathered via employee and user feedback, data and document analysis. Lugano will be used as an example in the following step.

Step 2. Describe the problem situation

From Step 1, the analyst has sufficient information to understand the problem space and document the situation through pictures or diagrams. The tool recommended in SSM is the rich picture diagram (Checkland and Scholes 1990; Checkland 2000; Checkland and Poulter 2006). This diagram outlines the problem situation using a graphical representation of the different relationships, communication mechanisms, processes, structure, people, concerns, conflict, and climate. A rich picture can incorporate images, text, symbols, and icons.

Figure 31 provides an example of part of a rich picture. This example highlights Lugano's relationships between the digital services provided to users, and the support mechanisms in place to provide guidance when needed. The problem situation Lugano is the increased requirement for support and the decreased use of digital services. The problems highlighted in Lugano's example include the need for skills development and training for users, accuracy and relevance of information and records provided, and access to services.

Figure 31. Example rich picture from a digital service offering perspective, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0



Step 3. Develop key definitions

Once the rich picture has been created, the next step is to determine the best way for the system to function. This process starts with creating root definitions which provide an ideal view of the key systems and structures (Checkland and Scholes 1990; Checkland 2000; Checkland and Poulter 2006). This commonly follows the CATWOE elements (Checkland and Scholes 1990; Checkland 2000; Checkland and Poulter 2006). Using the sample organisation:

Customers: Who are Lugano's clients, and the users, stakeholders, and key players within a system?

Actors: Who are the employees within the organisation who support the transformation process?

Transformation: Which process will be transformed by Lugano, specifically considering what the output is and how the problem will be solved?

Worldview/Weltanschauung: What is the bigger picture or the environmental view of the situation, specifically the stakeholders within the environment who can influence the transformation?

Owners: Who within Lugano can make the changes or has the power to approve the start and end of the project or transformation?

Environmental constraints: What are the elements within the environment which influence Lugano and have the capacity to impact the system negatively, and how should they be managed?

CATWOE supports the creation of the root definition, which is defined as the representation of the problem situation to be addressed. Therefore, a root definition is defined as a statement which concisely and clearly describes the system of interest (or under review). It commonly starts with a single sentence that begins with 'A system to' followed by 'all key elements of the system'.

Table 7. A CATWOE example using Lugano

CATWOE	Example
Clients	System users or clients who interact with the digital service or Lugano generally.
Actors	Frontline telephone staff, software developers, marketing departments.
Transformation	Improvements to the functionality of the digital services to make them easier to use, using co-design and collaboration with users and key stakeholders to create a service that is fit for purpose.
Worldview	There are many different digital services offered in both private and public sectors. We need to understand how we compare, and the expectations these have created. Greater reliance on digital services within the environment.
Owners	CEO, Chief Digital Officer.
Environmental constraints	Access to technology, skills and experience within the environment, willingness to adopt.

Table 8. A root definition example using Lugano

	Example
Root definition	A system to improve the digital service provided to users enabling 100% online self-service of their financial requirements, meeting the data storage standards, client demands and incorporating innovative technology.

Tables 7 and 8 provide an example of CATWOE and creating the root definition for the digital service example. This example shows the key players and the aim of the transformation within the root definition.

Through this approach, the problem became clearer, and the system of interest became the digital service and surrounding environment.

When applying SSM its important to understand the transformation component correctly, especially in relation to inputs and outputs (Checkland and Scholes 1990; Checkland 2000; Checkland and Poulter 2006). This is outlined in Figure 32, which shows that Input (I) should support the transformation and lead to the Output (O). A common mistake is incorrectly identifying the system input (the entity change) with the resources required to implement the change.

Figure 32. Inputs create transformation which leads to outputs, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0

Forbes and Checkland (1987) provided some definitions and rules to support the documentation of the transformation:

- (T) transforms the Input (I) into Outputs (O).
- The input must be present in the output; however, it will be in a different or changed state.
- An abstract (intangible) input will create an abstract (intangible) outcome.
- A tangible (concrete) input will create a tangible (concrete) output.

Step 4: Create conceptual models

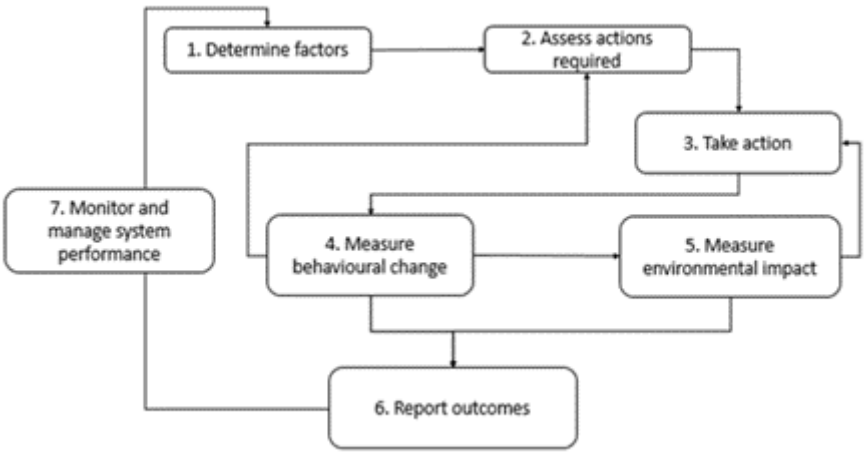
This step requires creating a conceptual model which is used to analyse the activities which need to occur to undertake the transformation. The activities outlined should only be based on actions taken by actors (internal to the organisation). These activities need to link back to the root definition and be limited to a

project group to control (Wilson 2001). All activities need to achieve the objectives of the transformation, and activities must include monitoring the transformation and providing feedback. It should consider what is meant by success, how it is measured and who will measure it.

The key activities required for the digital services example include:

1. Determine what factors influence digital service use.
2. Assess actions required to improve these.
3. Take action.
4. Measure behavioural change.
5. Measure impact of change on the environment.
6. Report results.
7. Monitor and manage the system performance, recommend improvements.

Figure 33. Example draft of the digital services conceptual map, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0



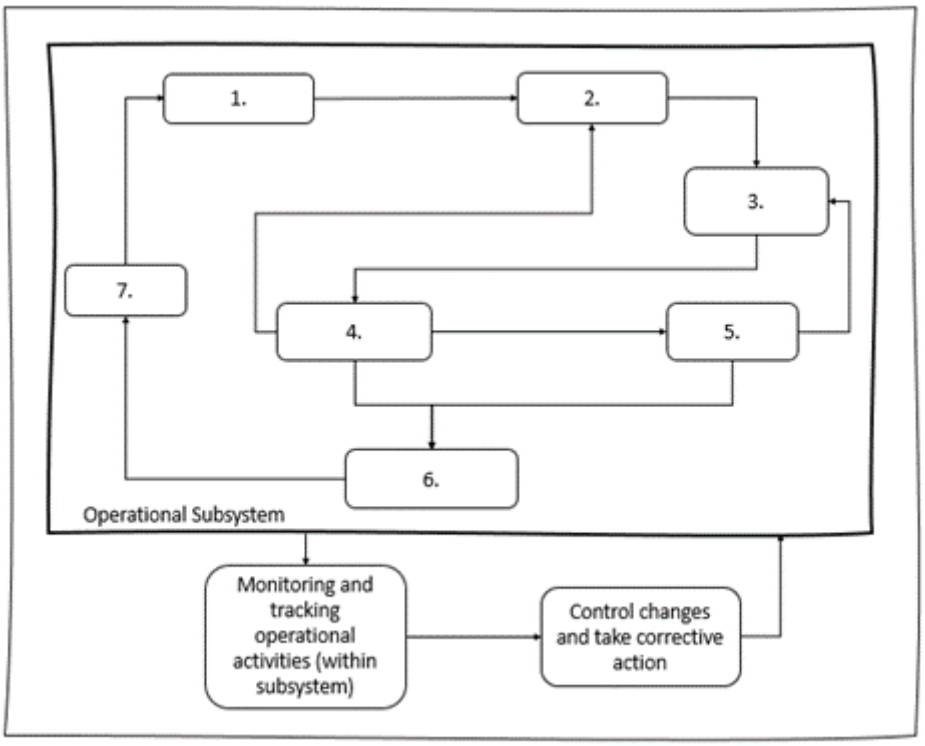
As outlined in Figure 33, there are clear operational activities which need to be taken to activate the transformation. Each activity should be monitored to ensure it is easy to follow and that there is a clear process in place. The conceptual model outlined in Figure 33 is in draft state – it shows a starting point for developing a complete model.

Within a conceptual model, Forbes and Checkland (1987) recommended:

- having 7+/-2 activities of the same size
- describing each activity using a verb
- using arrows to show logical dependencies
- numbering activities to reaffirm the dependencies.

Conceptual models are made to document HAS, which are softer models (Tavella and Hjortso 2012). This is because it is difficult for human behaviour to repeat and reproduce the same actions repeatedly with the same results. Therefore, there is an innate variability in the human activities and performances outlined within the conceptual models. These still require monitoring and controlling to support the transformation and ensure that changes are made as required. The overarching structure of a HAS is outlined in Figure 34, and this approach can be used to support improvements to the conceptual model. This calls out the operational system within the organisation's control (operational subsystem) and the elements which occur outside of the direct control of the organisation, this being the response to the implemented change. These are tracked and monitored and as changes are required, they are implemented.

Figure 34. HAS overarching structure, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0



This monitoring and controlling process should follow the 3Es: effective, efficient, efficacy (Wilson 2001; Checkland 2000). When planning, the transformation needs to consider:

- **Effective**: Is the system acting in the way it should be? Does the system contribute to the broader organisational goals?
- **Efficient**: Does the system use the least number of resources? Does it use the resources appropriately?
- **Efficacy**: Does the system provide the expected results?

Using the 3Es, a project manager is better equipped to determine what level of monitoring and controlling is required and how it could be completed.

Another critical component of a conceptual model is the use of feedback loops (Checkland 2000; Wilson 2001). Within conceptual models, there are commonly two forms:

- Internal feedback loop. This loop highlights how the actors (or the individual completing the work) need to alter how they work to meet the transformation.
- External feedback loop. This loop looks at the links between the inputs and the outputs, specifically interested in how the system is performing.

Therefore, an effective project manager needs to clearly define their success measures for the transformation and ensure that they are built into the system.

Step 5. Compare conceptual models to reality

Conceptual models are developed through applying theory; however, they are not necessarily representative of reality. Therefore, Step 5 requires an understanding of how much these models reflect the real world (Checkland 2000; Wilson 2001). This requires an analysis of the gaps, to determine whether the provided solution will meet the needs. This analysis is required to understand:

- conceptual model activities
- the real world
- what can be completed.

Table 9 is an example of the analysis for the digital services transformation, using 3 columns based on the above analysis questions.

Table 9. Example conceptual model vs. real world comparison (digital services example)

Conceptual model activities	Real world	What can be completed
Determine what factors influence digital service use.	Perform an analysis of the needs and expectations of the clients. This can be an ongoing feedback mechanism (for example, a feedback survey).	Document feedback and analyse the needs of clients and users.
Assess actions required to improve these.	Strategy determined based on feedback of achievable actions that can be implemented to improve the system.	Outline doable tasks and activities and build an iterative approach to improve the service.
Take action.	Implement the strategies.	Do the work.
Measure behavioural change.	Understand the current state (use as a baseline) and document improvements over time.	Update measures of behavioural change associated with digital service use.
Measure impact of change on the environment.	Understand the current state of the interactions with the environment, create a baseline and outline factors for measurement.	Update measures of the environmental impact as required (for example, ecological, social, cultural).
Report results.	Based on measures outlined in behavioural change and environmental change, document the results of the intervention.	Complete analysis at specific intervals to understand the impact of the intervention.
Monitor and manage the system performance and recommend improvements.	Undertake assessment of the progress and recommend improvements (or start process from scratch).	Use results to develop future improvements and create a cyclical approach to improvements.

Step 6. Assess feasibility and define changes

Based on the results of Step 5, a feasibility assessment is required of the suggested changes (Checkland 2000; Wilson 2001). The changes are normally classified as a change in:

- organisational structure
- procedures and processes
- attitudes or behaviours.

This requires an analysis of 3 primary elements: feasibility, priorities and risk analysis.

Feasibility

Feasibility requires understanding how the different activities will be undertaken. A feasibility analysis will need to consider whether something is achievable (Checkland and Scholes 1990; Checkland 2000; Checkland and Poulter 2006), based on:

- Cultural feasibility: Will the employees or actors involved be able to complete the work?
- Technical feasibility: What is the required support or modern technology required to implement the change?
- Dependencies: Are there links between the organisational and technological systems? What order do

updates need to go in?

- Win-Win: Do the recommended changes make it easier for the organisation, employees, and clients?

Priorities

This is a vital component; the changes need to be prioritised based on what impact they will have on the desired transformation, what risks they pose and how difficult they will be to implement. This can follow Kaplan and Norton's (1993) balanced scorecard approach – an example of factors is outlined in Figure 35.

Figure 35. Example of the balanced scorecard for the digital services example, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0

According to Kaplan and Norton (1993) there are 4 primary elements within the balanced scorecard and successful organisations, projects, and transformation find a balance between each of these components. Each component provides a different view of the organisation to operate efficiently and effectively. These components are:

- Financial perspective: outlines the different cost measures involved in the organisation, project and or change.
- Client perspective: outlines how client satisfaction, retention and market share will be measured and improved.
- Internal processes perspective: outlines what the change will cost and how it will impact the quality of the internal business processes.
- Innovative perspective: outlines measures of employee satisfaction, knowledge management, improvement rates and number or percentage of employees included in the improvement.

These 4 components or perspectives are interlinked – they do not function in isolation. Using the scorecard approach, the factors within the perspectives need to consider:

- objectives: organisational objectives and strategies
- measures: following the objectives, how you will measure progress
- targets: what is the objective aiming to achieve
- initiatives: actions taken to meet the objectives.

Risk analysis

The third tool to support feasibility assessment is the completion of a risk assessment. Risk analysis is the process which determines the likelihood and impact of a risk occurring. The assessment considers how the risk will impact the project schedule, quality, budget, and scope. The analysis technique recommended in SSM is the risk analysis matrix.

The risk analysis matrix assesses the likelihood of a risk occurring and the overall severity if it were to occur. These are classified by importance and impact. Likelihood and consequence (impact) are measured as low, medium, high, or very high (Vose 2008), as shown in Figure 36.

Figure 36. Example of a risk analysis matrix, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0

		Impact				
		Insignificant	Minor	Moderate	Major	Severe
Likelihood	Certain	Medium	High	Very high	Very high	Very high
	Likely	Medium	High	High	Very high	Very high
	Possible	Low	Medium	High	High	Very high
	Unlikely	Low	Low	Medium	Medium	High
	Rare	Low	Low	Low	Low	Medium

Each risk should be identified, analysed, and considered as part of the feasibility assessment.

To complete the assessment, the project manager should understand the potential feasibility of the changes, the priority of each change and the level of risk associated. This should be used as a guide to help determine which changes should be implemented.

Step 7. Take action to implement proposed changes

The final step is to implement the proposed and agreed upon changes (as outlined in Step 6). The implementation should follow the required steps outlined within the conceptual model (and reality analysis). Once implemented, there is a potential for the system changes to provide new opportunities and problems that require responses. As a result, the process would need to start again.

Advantages of SSM

There are several advantages to applying SSM, including:

- provides a structure for complex problems or situations
- easy to follow steps
- rigorous testing required
- encourages multiple iterations.

Disadvantages of SSM

There are several potential disadvantages to applying SSM, including:

- requires organisational change, which can be difficult to convince stakeholders of
- solutions can be narrowed down too early
- rich pictures are challenging to create, due to their lack of structure
- actions are expected quickly; however, the process can be time consuming.

In sum, SSM provides an analysis tool and technique which outlines the different requirements for the system transformation. This module outlines the 7 primary steps required to implement the methodology. SSM is a systems approach which can be used to undertake problem-solving and analysis of complex situations. Therefore, a cycle of research, learning and reflection is recommended based on the perceptions of all the stakeholders to better provide solutions for the problem space.

Test your knowledge

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Key Takeaways

- A system is composed of numerous related and dependent components which, through interactions with one another, create a whole. Therefore, a system is a compilation of distinct factors or components which form a complex whole.
- By viewing the project management process as a system which operates as an entity comprised of sub-systems, project managers can identify areas within the project which could lead to success or failure.
- Systems approaches can be applied through a cyclical approach which considers the relationships between each component of a project phase.
- SSM is used to create structure in complex problem and then develop changes which are both feasible for and wanted by all the stakeholders.

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9.

PROJECT DESIGN MANAGEMENT AS A METHODOLOGY

Learning Outcomes

- Contextualise the phases of the Design Management Method (DMM).
- Articulate the key benefits of DMM for project managers.
- Determine the importance of DMM as the new Parading in project management.

Companies that manage design effectively and efficiently attain better performance than those that do not. Therefore, good design does not emerge by chance or by simply investing in design but rather as the result of a managed process. (Chiva and Alegre 2009)

Design Management

Design is a potent differentiator that some organisations use to distinguish themselves from their competitors. Implementing excellent design is not a stand-alone task; rather, businesses must build a wide range of project management skills in this area. Such design capabilities are increasingly acknowledged as a source of competitive advantage; however, they are frequently neglected by businesses due to their lack of understanding of how to implement this approach.

Design management refers to the management activities, methodologies, and competencies necessary to optimise and oversee design processes. In the 1980s, the marketing 'expert', Philip Kotler, asserted that the significance of design to a company's competitiveness was obvious (Kotler 1984). However, it is only in recent times that design has gained popularity within businesses' competitive methods.

In project management, design is a comprehensive approach. Managing design for successful projects is not just about the control of a creative process; it is also about delivering outputs effectively, efficiently, and efficaciously, such as achieving project objectives and outcomes at all levels and meeting all stakeholders' requirements. The effective management of the design process helps decrease design-related problems in

the project life cycle as well as minimise the overall project risks. This method also enables profitability maximisation for the organisation by providing a platform for continuous improvement. This is captured in the project design definition statement by Murray and Thomas (2008:2) below:

> *Project design embodies the evaluation of possible outcomes early-on, before committing to a course of action. By rapidly exploring possibilities – through dialogue, analysis and prototyping – awareness is built and better results are achieved. And as things change (they always do, don't they?) a good design is easily adjusted.*

Successful businesses would never create a product and put it into production without the use of modelling, simulations, or prototypes. A good project design and plan is needed to justify this process. According to Murray and Thomas (2008), project design, therefore, facilitates the project life cycle by bridging the gap between the strategic decision to execute the project and its actual implementation. It aids in responding to the issue of deciding on the most optimal and viable method for executing the project.

Therefore, why design?

We would like you to consider these 4 main reasons:

1. As a methodology, project design recognises, assesses, and describes the enormous coordinating effort inherent in all big projects.
2. It supports intricate interdependencies and provides a technique for rapidly recognising, assessing, and adjusting these interdependencies using visual modelling and simulation prior to time and cost impacts.
3. An effective project design management approach can eliminate ambiguity about the project's scope and save time and money in the long run.
4. Companies that invest in design encourage innovation.

By establishing a clear project design framework, the management of the project life cycle in general will be facilitated by bridging the gap that often exists between the strategic decision to execute the project and its actual implementation. A clear project design framework will also aid in responding to the issue of what is the most optimal and viable method for executing the project, because it is a method embedded within all the existing approaches but also one that stands on its own.

Stages involved in project design

To be able to start you must be a CREATIVE project manager. Creativity and the ability to generate ideas/ innovation are two core skills a project manager requires to design. In addition, for the organisation to

properly manage design, they need to have a design management process that is both well-planned and highly efficient. Therefore, the DMM implementation for an organisation begins with the formulation of an implementation strategy, project conceptualisation and design review. These 3 stages will include the components highlighted in Table 10.

Table 10. DMM's 3 core stages

Stage 1: Strategy Plan	**Stage 2: Project Conceptualisation**	**Stage 3: Design Review**
Strategy and implementation recommendations	Fix requirements	Project design analysis and evaluation
Evaluation of business strategy	Consensus and/or negotiation of agreement	Project design appraisal
Facilitating DMM processes	Project simulations	Planned trade-offs
DMM criteria, requirements, and facts	Project evaluation	Optimisation
DMP framework and resources	Project product outcome Prototyping/service outcome design	
Training in DMM		

Understanding the project's purpose is essential for developing efficient project designs. Additional strategies for designing project plans include the following.

Focus on the objective. Align the project objectives with project deliverables to ensure that they are met while the project is executed. Start with the desired outcome and move backwards. Using project timeline tools such as Gantt Charts and a Work Breakdown Structures, the project manager can combine project objectives with the correct actions necessary to fulfil them.

Stakeholder engagement. Communication is vital for the success of every endeavour. It is the project manager's role to invite team members and stakeholders to participate in project design consultations. This helps align all parties and ensures that they are aware of and committed to the project's objectives.

Review and modify. Designing a project is not a one-done method. The design documentation may

require modifications and updates over time. It is normal practice to modify project plans when new information is gathered as the project progresses.

A feasibility study. As discussed in earlier modules, this is a report that describes the optimal solution in broad but realistic terms. Additional research and development (R&D) may be necessary when establishing the facts to start the design of a project.

Develop prototypes. The adoption of models and simulations such as distribution, and scheduling is recommended.

According to Scacandi (2012) the following are critical tasks to define design requirements in the project life cycle.

1. *Specify owner design specifications and project design prerequisites*

In addition to the design-related information collected for the project, the project manager should collect any extra design-related information from all the relevant stakeholders. Identify any gaps in the available information and endeavour to get the missing data. This is the ideal moment to meet with the project host organisation, examine any design-related information, and determine how to proceed with gathering further data.

2. *Engage design consultants*

Now is the time to recruit all the essential design project team members needed to create the functional design brief and the concept design. It is crucial that the consultant's job scope and needed degree of input be spelt out very clearly in their contract agreement.

3. *Prepare the initial design concept*

Manage and organise the design project team to create the initial design concept that responds to and documents all the stakeholder's needs and criteria and serves as the basis for the design to be approved and moved to a planning and executing phase. The concept design needs to be complemented by concept design sketches and a complete design proposal report.

4. *Develop the design management strategy*

At this point of the design process, it is necessary to create the design management strategy, which serves as a guide for how the design will be managed. It is a crucial component of the project manager's project management strategy. Figure 37 shows a flowchart of the events that need to be undertaken to develop the project management strategy.

Figure 37. Design project management strategy, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0

5. *Outline the project cost plan*

The design project manager is responsible for supervising and coordinating the creation of the outline cost plan while incorporating the feedback of all relevant design consultants.

6. *Specify the risks posed by the design*

During the business case phase, any design-related risks that have been discovered should be analysed and elaborated on by the whole design team. Any risks connected to the design of the safety feature should also be recognised. After that, the project manager should assess the risks posed by the design, and the steps you took to mitigate those risks should be documented in the overall risk register. This will serve as the basis for future use and ongoing management.

7. *Value proposition – Return on Investment*

At this point in time, the design project manager ought to organise a session on value management. The purpose of a value management proposition is to conduct an exhaustive analysis of a project's primary functions or performance in order to obtain the greatest possible return on investment (ROI). It gives a summary of the project's goal as well as the recurring and one-time costs associated with it.

8. *Determine the procedure for project approvals*

At this point, it is the responsibility of the design project manager to collaborate with their design team in order to establish and clarify the process of planning approval and to integrate this with the needs of the whole design process.

9. *Construct the report on the final design*

Complete the functional design brief, concept drawings, and an outline design report for delivery to the project host organisation. The outline design report should include the conclusions of the outline design process. Before moving on to the next stage of design, this step allows all key stakeholders the chance to offer their comments and suggestions. After the project host organisation has given its approval, the design project manager is able to move on to the next step of the project's life cycle, which is the scheduling design phase.

Like every project management methodology or approach, the design management methodology is one that follows the flow of the project life cycle. Project managers must start by having a conversation about the project's objectives and intended outcomes with their team and any other key stakeholders. To get started, we recommend organising a brainstorming session during which the project manager will document the overall project plan as well as the major deliverables. Project managers have a better understanding of the criteria and standards for the project after gathering the right amount of information. If the project manager communicates with the team and asks for their input on the project's practicability and feasibility, this will decrease the amount of time spent on planning, executing, and reviewing the project and enhance the likelihood that it will be successful.

Establish the primary goals of the project, then break each one down into smaller, more achievable pieces and activities. These need to contain all the actions and tasks that you, as the project manager, will carry out over the course of the project. It is recommended that the project manager pays close attention to anything that could stand in the way of finishing the project as soon as possible. To evaluate the factors that could have an effect on one's level of success, it is necessary to take into account potential drawbacks, such as limitations in terms of time, money, and resources (remember the rule of the iron triangle). Maintaining communication with the relevant teams and stakeholders to find solutions to these problems before the project gets underway is also a must step while adopting DMM. Determine the factors that will regulate accomplishing the project and compile a list of criteria to determine whether or not the results, deliverables, and completed outcomes have been attained. Find out who is in charge of the approvals and the processes that need to be followed for the approvals to go through successfully and just in time. This will minimise potential delays.

In sum, the project manager is initially responsible for designing the project and this is one of their key responsibilities. At this stage, choices must be made about how to manage and steer the project administratively and ethically. In the process of developing a project plan, attention is paid to the requirements of the project's stakeholders, the organisation, and, of course, the project itself. Following

that, the next stages of the project will be supervised with the help of the overall design management strategy.

If the entirety of the development process as well as the outcome of the project are dependent on the structure of the project design, then you could give some thought to how difficult and crucial it is for the structure of the project design itself to be effective from the start. A project design may assist in removing any potential roadblocks from the process of developing the project and can also help lessen any confusion regarding the project objectives and outcomes that may exist among those participating in the project. Therefore, it is critical that you master this approach if you wish to excel as a project manager.

Just remember: Design is the initial step towards a project success.

Test your knowledge

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Key Takeaways

The following elements come together to form a comprehensive project design:

- a comprehensive explanation of the organisation or company that will be in charge of the expansion of the project and the responsibilities that come along with that
- a comprehensive review of the project, including its history and recommendations for its future growth
- the aims, milestones, goals, and outcomes of the project are clearly outlined.

Design project management encompasses each and every product, key deliveries, assessment and monitoring standards, as well as features of success project criteria.

Design project management is the act of handling incoming design requests, assigning work to team members, and managing the project life cycle until its conclusion.

Design management methodology demands effective project collaboration

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10.

SELECTING THE RIGHT PROJECT MANAGEMENT METHODOLOGY: IS THERE SUCH A THING?

Learning Outcomes

- Conceptually map the key strategies to evaluate project management methodologies.
- Analyse the process of selecting a project management methodology.
- Assess the criteria involved in selecting a project management methodology.

Let's start this module by reading the article titled 'One size does not fit all: choosing the right project approach' by Burgan and Burgan (2014) which highlights the core message of this book – every project is unique and methodologies cannot be prescribed. On the contrary, choosing a methodology that fits with your project is a self-organised process and one which involves the collaboration of key project stakeholders.

The reality is that it does not matter how you choose a methodology for your project. What does matter is that the methodology aligns with the business strategy and overall goals. Project management methodologies (PMM) and frameworks are only advantageous when they are implemented pragmatically. Things will go horribly wrong if you simply remove them from the shelf (i.e., use existing templates) and force them on the organisation. However, if you study and comprehend the methodology/framework, adapt it to the organisation's strategies and needs, and implement it correctly, as a project manager you will produce something of value. Project management techniques and frameworks will be beneficial only if you use a practical strategy to execute them. When a framework or approach is imposed on a project, the outcome will be negative.

The organisation's implementation of project management practices may have a substantial influence on project results and team productivity. It is essential to be deliberate about your company's project management practices to teach your project team effectively and get the required results. The following are key strategies to consider when selecting the most appropriate methodology:

1. *Evaluate the project's requirements*

Make sure you obtain clear information on the project's objectives and resource availability. Creating a detailed summary of the project requirements can make it easy to evaluate which method best matches the organisation's strategy and requirements. Gather as much information as possible.

2. *Consider the risks and benefits*

Create forecasts based on your experience and existing project data regarding the potential risks and success probabilities associated with each method. The approach with the greatest potential for success may also have the greatest chance of failure; thus, you should discuss this with your team and determine how much risk to assume.

3. *Identify some of the key variables*

Determine which factors are most crucial to the success of your project after you have a fundamental grasp of its constraints. This will help you prioritise different components of the project, allowing you to select a project management method style that aligns with the organisation's primary objectives.

4. *Identify the project type*

Choosing a project management technique should be driven by the sort of project you are managing. As the project manager you need to take into consideration the length and complexities of the project as well as the delivery timeline. Additionally, you must collect the overall budget, the project goals, the client's requirements, viable risks, team members' capabilities, asset inventory, and stakeholders' influence and align all these with the organisation's strategy.

5. *Evaluate the project complexities*

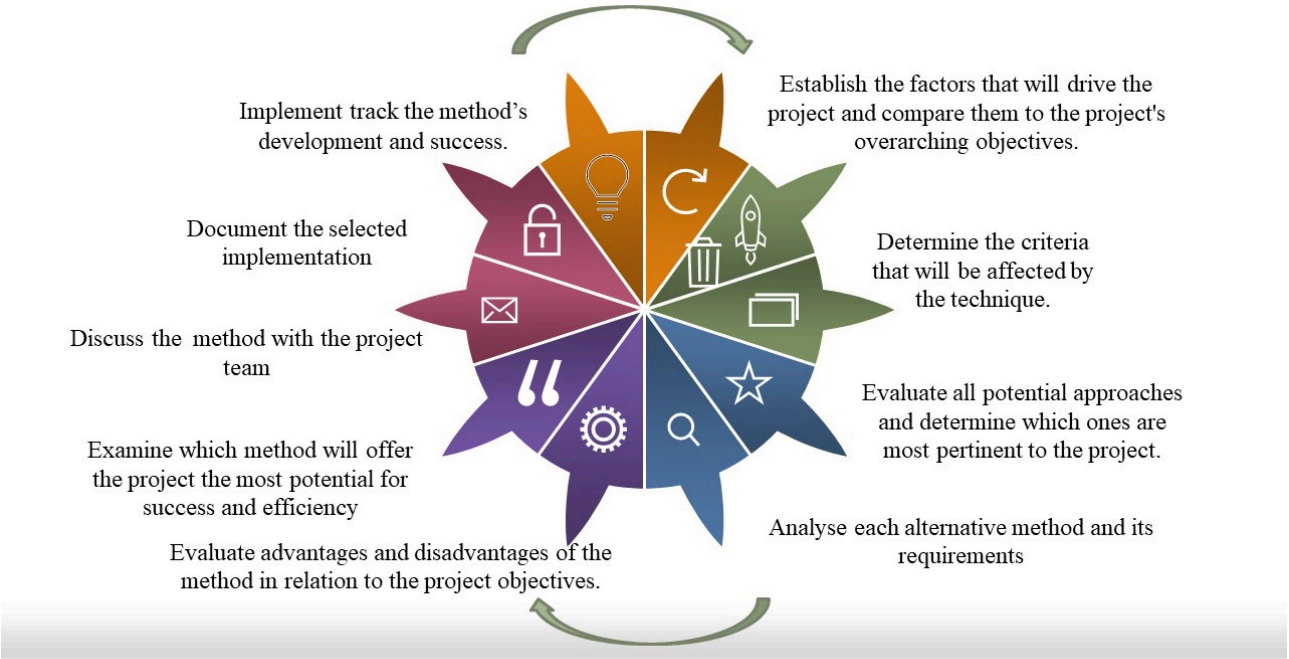
The project manager needs to evaluate the difficulty of executing various jobs. Some projects require extra resources and specific skills. You need to assess if the organisation has the essential assets and assess whether the project may require scaling during the course of its execution.

A common problem that arises when evaluating methods is when an organisation adopts a trending methodology just because it is popular. It is the responsibility of the project manager to undertake a detailed evaluation of the key points suggested above and present a comparative report of at least two matching methodologies to the organisation and the project team. Once you have a better understanding of the scope of your project, you will have a better notion of which type of method will best suit your team's requirements. Start analysing the advantages and disadvantages of various project management approaches, taking into account whether you're working on a simple or complex project, the elements influencing the delivery of the project, the criteria that may influence certain facets of each approach and whether the project management method enables you to fulfil your organisation's needs and requirements.

Just remember: selecting the appropriate project management approach is crucial to your team's ability to execute projects on time and under budget.

Figure 38 shows the suggested steps to determine the most appropriate project management approach. This can be conducted after considering the 5 strategies discussed above.

Figure 38. Guided steps for selecting a methodology, by Carmen Reaiche and Samantha Papavasiliou, licensed under CC BY (Attribution) 4.0



We can compare a methodology to a road plan or set of blueprints for a project, since it provides teams with a set of instructions and procedures that aims to deliver a project to a successful end. Therefore, selecting the right methodology is a critical but also a complex step. This is due to the numerous types of project methods that have emerged to fulfil the requirements of diverse sectors and organisations. In this eBook, we have briefly discussed some of the key project management methodologies: PRINCE2, Critical Path Management, Waterfall, Agile, Scrum, eXtreme PM, Kanban and others. But we are unable to tell you which one is best because each methodology will fit each type of project and all of this is a unique process only known when all the information is gathered and the project manager and their team assess the steps suggested in Figure 37. Project management methodologies are therefore fundamentally distinct approaches to managing a project. Each has its own procedure and workflow matching a unique project.

The following article, 'The methods of selection of the project management methodology', by Kononenko and Kharazii (2014) provides approaches for selecting methodologies that are applicable under various situations, reviewing their strengths and shortcomings, and the scope of their efficient usage. Please take time to read it.

Overall, optimising the project's scope is the most exact criterion for selecting a project management methodology. To this end, it is necessary to optimise the project scope based on 5 criteria: profit, cost, time, quality, and risks, subject to the use of one of the basic approaches that narrows the list of proposed methodologies to a small number.

Test your knowledge

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https://jcu.pressbooks.pub/pmmethods/?p=178#h5p-26

Let's conclude by viewing the following video summarising some of the key PMM and why to choose each project management methodology

Video [3 mins, 29 sec] **Note:** Closed captions are available by selecting the CC button in the video below.

https://jcu.pressbooks.pub/pmmethods/?p=178#h5p-1

Key Takeaways

- The sort of project or process you manage is the determining element for the appropriate method.
- You must recognise that establishing a technique or framework requires years of laborious effort.
- With the right PMM in place, the team will be able to get to work fast, standardise outputs, and make quicker decisions.
- PMM should assist with discovering and managing opportunities and threats.
- PMM should aid in defining project objectives and scope by embracing the best practices of all project management group procedures.

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