

TRENDS IN MODERN PROJECT MANAGEMENT, PAST, PRESENT & FUTURE

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See also: *The Origins of Modern Project Management:*

https://mosaicprojects.com.au/PDF_Papers/P050_Origins_of_Modern_PM.pdf

'A Brief History of Scheduling - Back to the Future'

https://mosaicprojects.com.au/PDF_Papers/P042_History_of_Scheduling.pdf

Mosaic's complete PM History resource is available from:

<https://mosaicprojects.com.au/PMKI-ZSY.php>

For more risk management papers see:

<https://mosaicprojects.com.au/PMKI-SCH-045.php>

Introduction

This is the third paper in a series looking at the origins of modern project management and more importantly, attempting to predict likely developments in the future.

The first paper '*A Brief History of Scheduling*ⁱ' traced the origins of 'Critical Path Scheduling' from the initial projects to develop the techniques through to today¹. The second paper examined the '*The Origins of Modern Project Management*ⁱⁱ'. This paper traces the evolution of the profession of project management, identifying its technological roots, its philosophical roots in general management theory, the forces that created the project management associations and how the three factors combined to create the emerging profession of 'modern project management'².

This final paper in the series will provide a brief summary of the two earlier papers and then consider the nature of the 'projects' that are the object of project management and seek to identify key trends and themes leading into the futureⁱⁱⁱ.

The Past

Projects in one form or another have been undertaken for millennia, but it was only in the latter part of the 20th century people started talking about 'project management'. Earlier endeavours were seen as acts of worship, engineering or nation building. And the people controlling the endeavours saw themselves as members of groups focused on specific callings such as generals, priests and architects.

There is an important distinction to be drawn here between projects: '*a temporary endeavour undertaken to create a unique product, service or result*' and the profession of project management; or at least 'modern project management'. For a discipline to be considered a profession a number of attributes are generally considered necessary; these are:

- practitioners are required to meet formal educational and entry requirements,
- autonomy over the terms and conditions of practice,
- a code of ethics,
- a commitment to service ideals,
- a monopoly over a discrete body of knowledge and related skills.

Within this context, project management is best considered an 'emerging profession' that has developed during the last 30 to 40 years. Over this period project management associations around the world have developed a generally consistent view of the processes involved in 'project management', encoded these views into 'Bodies of Knowledge' (BoKs), described competent behaviours and are now certifying knowledgeable and/or competent 'Project Managers'. Certainly, if 'modern project management' does not qualify as a fully fledged profession at this point in time, it will evolve into one fairly quickly.

ⁱ Download '*A Brief History of Scheduling*' from:
https://mosaicprojects.com.au/PDF_Papers/P042_History_of_Scheduling.pdf

ⁱⁱ Download '*The Origins of Modern Project Management*' from:
https://mosaicprojects.com.au/PDF_Papers/P050_Origins_of_Modern_PM.pdf

ⁱⁱⁱ To see the events discussed in this paper in a comprehensive historical timeline download
Project Management - A Historical Timeline:
https://mosaicprojects.com.au/PDF_Papers/P212_Historical_Timeline.pdf

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From a historical perspective this raises two questions, where did the ideas embedded in the BoKs come from and what gave rise to the formation of the project management associations that are creating our profession?

The Evolution of Project Management Theory

The genesis of the ideas that led to the development of modern project management can arguably be traced back to the protestant reformation of the 15th century. The Protestants and later the Puritans introduced a number of ideas including ‘reductionism’, ‘individualism’ and the ‘protestant work ethic’ (PWE) that resonate strongly in the spirit of modern project management.

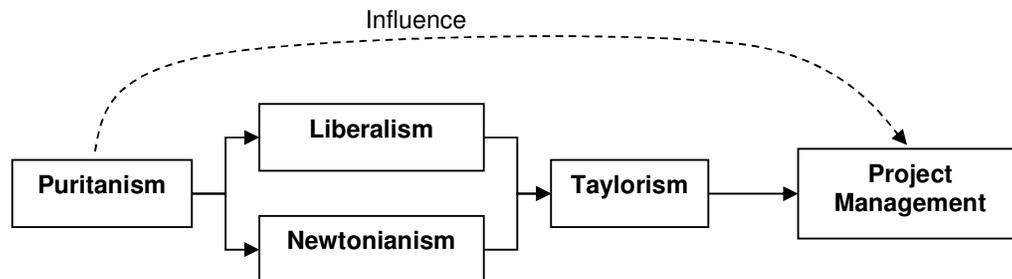
Reductionism focuses on removing unnecessary elements of a process or ‘ceremony’ and then breaking the process down into its smallest task or unit to ‘understand’ how it works.

Individualism assumes we are active, independent agents who can manage risks and create ideas. These ideas are made into ‘real things’ by social actions contingent upon the availability of a language to describe them.

The PWE focuses on the intrinsic value of work. Prior to the protestant reformation most people saw work either as a necessary evil, or as a means to an end. For Protestants, serving God included participating in and working hard at worldly activities as this was part of God’s purpose for each individual. From the perspective of the evolution of modern project management, these ideas were incorporated into two key philosophies, Liberalism and Newtonianism.

Liberalism included the ideas of capitalism (Adam Smith), the division of labour, and that an industrious lifestyle would lead to wealthy societies.

Newtonianism marks the era of scientific enquiry. Newton saw the world as a harmonious mechanism controlled by a ‘universal law’. Applying scientific observations to parts of the whole would allow understanding and insights to occur and eventually a complete understanding.



For a full discussion of this diagram see ‘The impact of Puritan ideology on aspects of project management’. International Journal of Project Management 25 (2007) 10-20

Figure 1

Both of these philosophies influenced the scientific management theories of Taylor^{iv}. Taylor was undoubtedly influenced by his Quaker roots (Puritanism), worked in an intensely

^{iv} Taylor, Frederick Winslow, 1856-1915. See: *The Principles of Scientific Management*, published 1911

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capitalistic society (Liberalism) and used the scientific approach of Newtonianism in his work developing the 'Classical School' of scientific management. Henry Gantt, the inventor of the now ubiquitous Gantt chart (bar chart) belonged to this school.

The theories of 'scientific management' underpin much of modern project management.

- The concept of 'reductionism' is at the heart of project management techniques such as the Work Breakdown Structure.
- The Newtonian view of the world as a predictable 'clockwork' mechanism where inputs have predictable outputs is central to the ideas in scheduling and resource planning.
- Other branches of scientific management such as 'Bureaucratic Management' and 'Administrative Management' also resonate strongly in theories underpinning the project management 'bodies of knowledge'.

The Evolution of Project Management Tools

The central theme running through the various project management BoKs is that project management is an integrative process that has at its core, the balancing of the 'iron triangle' of time, cost and output. All three facets must be present for a management process to be considered project management.

The evolution of cost and scope control into relatively precise processes occurred during the 14th and 18th Centuries respectively. Time management lacked effective measurement and control until the emergence of 'critical path' scheduling in the 1960s.

The branch of management that gave rise to the development of the Critical Path Method of scheduling was Operational Research (OR). OR is an interdisciplinary science which uses methods such as mathematical modelling and statistics to assist decision making in complex real-world situations. It is distinguished by its ability to look at and improve an entire system, rather than concentrating on specific processes which was the focus of Taylor's 'scientific management'. The growth of OR was facilitated by the increasing availability and power of computers which were needed to carry out the large numbers of calculations typically required to analyse a system.

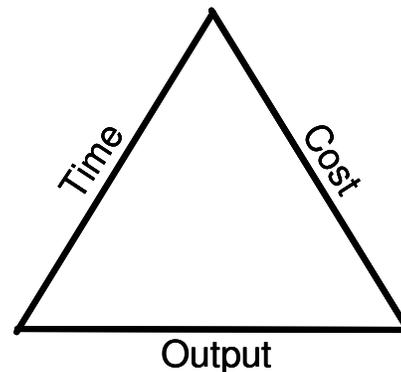


Figure 2 The 'Iron Triangle'

The first 'project' to add science to the process of time control was undertaken by Kelley and Walker to develop the Critical Path Method (CPM) for E.I. du Pont de Numours. In 1956/57 Kelly and Walker started developing the algorithms that became CPM. The program they developed was trialled on plant shutdowns in 1957 and the first paper on critical path scheduling was published in 1959. The critical meeting to approve this project was held on the 7th May 1957 in Newark, Delaware, where DuPont and Remington Rand jointly committed US\$226,400 to fund the project. The foundations of modern project management were laid in 1957; but it took another 12 years before Dr Martin Barnes first described the 'iron triangle' of time, cost and output in a course he developed for his UK clients in 1969 called 'Time and Money in Contract Control'.

The Formation of a Profession

The development of general management theory through to the 1960s, and the emergence of CPM from OR were the critical underpinnings for the creation of 'modern project management'. However, on their own they would not have been sufficient to create the emerging profession of 'modern project management'. This required the formation of the project management associations.

The catalyst for the spread of discussions on project management and the formation of associations to support these new ideas was the spread of scheduling, and more importantly professional schedulers during the 1960s. Arguably, the evolution of modern project management is a direct consequence of the schedulers need for forums to discuss and develop their new discipline. These needs led directly to the formation of the various project management associations. Certainly well over 50% of the people that founded INTERNET in Europe (the forerunner of IPMA^v and the APM^{vi}) and the PMI^{vii} in America were schedulers. Recollections of early conferences and publications from these associations strongly suggest that in the 1960s their focus was almost exclusively on project controls and 'scheduling'.

Once founded, it was (and still is) the various project management associations that led the development of a defined and documented 'project management body of knowledge'. Only after this body of knowledge was formulated did it become possible to define project management competencies, formally examine project management knowledge and start the process of creating the profession of 'modern project management'.

The Present

In its 50th year, the profession of 'modern project management' is facing many challenges and opportunities. The boundaries of our technology are merging into a range of other disciplines including communications, general management and corporate governance and arguably everything (or nothing) could be a project.

One dimension of the challenges faced by the profession of project management is defined by its success. Almost every organisation wants to be seen to be 'doing projects'. Projects are viewed as an important part of their endeavours to remain competitive (or effective) in a rapidly changing world. This challenge has been answered by the 'profession' by the development of standards, the description of competencies and the creation of examinable qualifications.

A Standardised Framework

The framework for implementing projects has been largely agreed and is supported by standards. The three domains of project, program and portfolio management have been agreed:

- Projects deliver defined outcomes (and seek to minimise 'unnecessary' change). The focus of project management is *'on time, on budget and meeting or exceeding stakeholder expectations in terms of output'*.

^v IPMA = International Project Management Association

^{vi} APM = Association for Project Management (UK)

^{vii} PMI = Project Management Institute

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- Major changes are delivered as Programs. Programs focus on delivering benefits to the organisation and manage a group of related projects to maximise the benefits realised. Program management recognises the need to adapt the program to maximise the benefits actually realised in an ever-changing world. However, as each project is initiated within the program, that part of the program’s scope should be as stable and unambiguous as possible.
- The top level of the hierarchy is Portfolio Management. This discipline focuses on selecting the right mix of projects and programs for the organisation. Working within the capacity constraints of the organisation, the portfolio manager seeks to balance:
 - long term and short term,
 - business improvement with business creation,
 - high risk with low risk, etc

The objective being to simultaneously maintain the current business, create its future and optimise the return on investment; guided by the organisations strategic plan; if nothing else an interesting challenge.

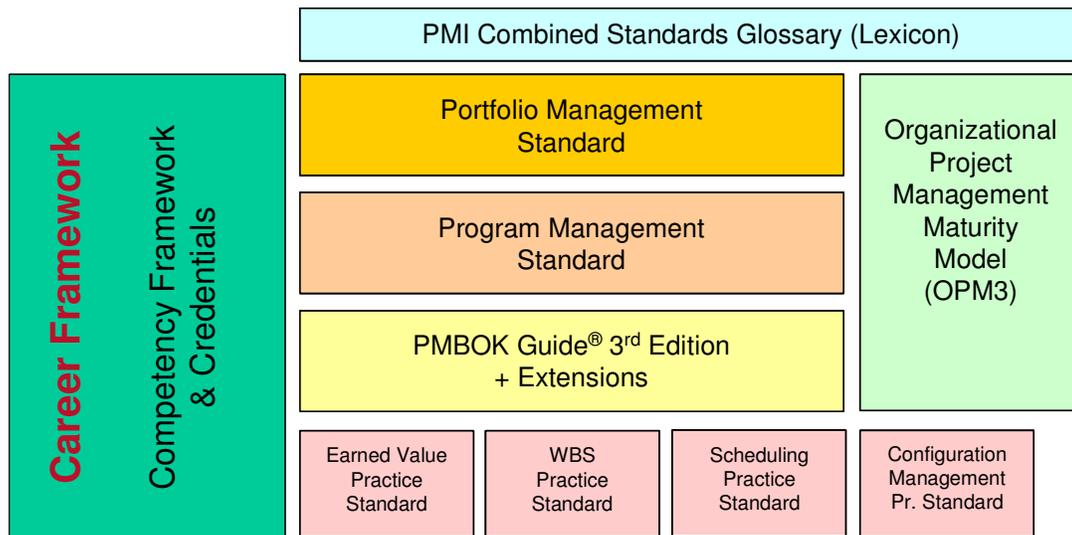


Figure 3 PMI’s range of Standards

A range of standards from OGC^{viii} and PMI^{ix} are available to describe the processes and objectives of these three levels of project management. Competency frameworks have been developed by PMI, IPMA and others; to describe the behaviours and skills required by project managers; and examinations have been created for the project and program levels by a range of institutions.

Governance

The question of the governance of project management has also been addressed. The leading publication in this area is *‘Directing Change, a guide to governance of project management’*,

^{viii} OGC = Office of Government Commerce (PRINCE2 and MSP standards).

^{ix} Project Management Institute: PMBOK Guide, Program and Portfolio Management Standards, OPM3 and others.

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freely available from the Association for Project Management (UK)^x. This topic was the focus of a series of three papers published by Weaver in Feb. 2005³, Oct. 2005⁴ and 2007⁵.

The challenge we face is that most mid level and senior managers responsible for managing the delivery of an organisations portfolio of projects and programs (or working in association with them) do not understand 'project management' and try to maintain a traditional 'command and control' approach. The failings of this approach were described by Bourne and Walker in 2005 in their paper *The Paradox of Project Control in a Matrix Organisation*⁶. Changing the attitudes of senior management to allow projects to be successful is a long term cultural issue.

One of the litmus tests for the development of a culture of effective project management and project governance within an organisation is the presence of a mature and effective PMO (or system of PMOs). The value of a mature PMO has been clearly demonstrated in a series of surveys undertaken by KPMG^{xi}. However, the reasons behind the measured improvements in project delivery associated with the presence of a 'mature PMO' are currently not well understood and the survival of PMOs within organisations seems to fluctuate depending on the current views of management. Very few organisations seem committed to the ideal of effective project governance supported by a robust system of PMOs^{xii}.

Certifications and Qualifications

The value of project management qualifications is also being recognised world-wide; certainly at the practitioner level the value of credentials in the form of industry certifications such as PMP and RegPM and higher level academic qualifications such as Masters and Doctors in Project Management is recognised and the credentials are being taken up by an ever increasing numbers of people. Data collected by the Australian Institute of Project Management clearly indicates a shift from the predominance of 'accidental project managers' towards 'aspirational project managers' who have chosen project management as a career option and expect to be professionally qualified as project managers^{xiii}. The challenge is to encourage senior management to allow professional project managers the freedom to create successful projects.

Summary

The direct consequence of the issues discussed above is the continuing high levels of project failures identified by KPMG, Standish, Gartner and others. Unfortunately, Cobb's Paradox still holds true: "We know why projects fail; we know how to prevent their failure -- so why do they still fail?"^{xiv} The challenge facing the profession of project management is to eliminate this paradox and dramatically improve the success rate of projects. Whilst the 'tactical battle' at the coal face of project management is being won, and the governors and owners of organisations are being forced to address 'project governance' by regulatory and

^x See <https://mosaicprojects.com.au/PMKI-ORG-005.php#Process3> for more on project governance.

^{xi} See <https://mosaicprojects.com.au/PMKI-ORG-045.php> for copies of the KPMG reports

^{xii} For more on this topic see *Designing a PMO to Succeed and Survive*:
https://mosaicprojects.com.au/PDF_Papers/P064_Designing_a_PMO.pdf

^{xiii} For more an accidental -v- aspirational project managers see: *The Accidental Project Manager*:
https://mosaicprojects.com.au/PDF_Papers/P036_The_Accidental_PM.pdf
Supercharge Your Project Performance:
https://mosaicprojects.com.au/PDF_Papers/P066_Supercharge_your_project_performance.pdf

^{xiv} Martin Cobb, Treasury Board of Canada Secretariat. Quoted by the Standish Group, 1996.

legislative imposts such as the Sarbanes Oxley Act; the main 'war' has only just started. The effort needed to change the attitudes of 'middle and senior management' and the culture of organisations will be much harder and take far longer but without this change project management will never deliver its full potential.

The above section of this paper summarises:

A Brief History of Scheduling download from: www.mosaicprojects.com.au/Resources_Papers_042.html

The Origins of Modern Project Management download from: www.mosaicprojects.com.au/Resources_Papers_050.html

The Future

Defining our place in the world

The biggest challenge facing project management is answering the question 'what is a project?' Until this question can be answered unambiguously the foundation of project management cannot be defined. Current definitions such as the PMBOK's '*a temporary endeavour undertaken to create a unique product, service or result*' can apply to the baking of a cake as easily as the construction of a multi story building. They are both temporary endeavours to create a unique outcome but in all probability the baking of a cake is not a project^{xv}.

The traditional view of projects embedded in the various BoKs is derived from both the management theories underpinning 'modern project management' and the industrial base of early project management practitioners (construction / defence / engineering). The BoKs tend to treat projects as naturally occurring entities that need to be managed. This is an easy enough assumption when focusing on a building or a battle ship. There is a physical presence that occupies a defined space that needs creating in a defined timeframe to a defined scope. This view assumes project exists and project management is about transforming the raw materials of the project into a finished and useful form. Consequently it is the presence of the project itself that defines 'project management'. The PMBOKs version is '*The application of knowledge, skills, tools and techniques to project activities to meet project requirements*'. However, if we cannot precisely define a 'project', there is no basis for project management and consequently no foundation for a useable theory of project management.

Embracing Complexity and Uncertainty

Researchers and academics are starting to reverse the idea that a project is necessary for project management to exist and suggest it is the application of 'project management' to an endeavour that creates a project. Some of the ideas being discussed include:

- Projects as 'Temporary Knowledge Organisations (TKOs)'. This school of thought focuses on the idea that the primary instrument of project management is the project team and the recognition that predictability is not a reality of project management⁷.
- The ideas around 'Complexity Theory' applied to projects⁸. Complexity theory has developed from and includes the earlier fields of study known as 'chaos theory'; it can be defined as the study of how order and patterns arise from apparently chaotic

^{xv} For more on the definition of projects see '*Project Fact or Fiction (Will the real Projects please stand up!)*': https://mosaicprojects.com.au/PDF_Papers/P007_Project_Fact.pdf

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systems and conversely how complex behaviour and structures emerge from simple underlying rules. Some key ideas include:

- The concept of the project team as a 'complex adaptive system (or organism)', living on the 'edge of chaos'; responding and adapting to its surroundings (ie the project's stakeholders) offers one new set of insights.
- The idea of 'Nonlinearity' suggests that you can do the same thing several times over and get completely different results. Small differences may lead to big changes whilst big variations may have minimal effect. This idea questions the validity of 'detailed programming' attempting to predict the path of a project (the 'butterfly effect', constrained by 'strange attractors').
- The concept of 'Complex Responsive Processes of Relating' (CRPR) puts emphasis on the interaction among people and the essentially responsive and participative nature of the human processes of organising and relating.
Organisation is an emergent property of many individual human beings interacting together through their complex responsive processes of relating⁸.

The consequence of accepting these theories is to shift the focus of 'project management' from the object of the project to the people involved in the project (ie, its stakeholders), and to recognise that it is people who create the project, work on the project and close the project. Consequently the purpose of most if not all project 'control documents' such as schedules and cost plans shift from being an attempt to 'control the future' - this is impossible; to a process for communicating with and influencing stakeholders to encourage and guide their involvement in the project^{xvi}.

The consideration of complexity theory and stakeholder communication is probably far more important on small internal projects who's survival is totally dependant on the whims of 'senior management' (the project must adapt to survive) than on large, complicated engineering and defence projects that are practically impossible to cancel once they have started.

The other closely linked element in the new world of project management is embracing uncertainty. Writing on paper cannot control the future! Schedules do not control time; cost plans do not control costs. Plans outline a possible future and provided a basis for recognising when things 'are not going to plan'. For project management to succeed, both project and senior management are going to need to embrace uncertainty and learn skills to manage it rather than expecting predictability and inevitably being disappointed by the variability of 'reality' as it unfolds^{xvii}.

Conclusions

The future of project management is predicted to be one that focuses on the skills needed to motivate, direct and lead the people that make up the project team to achieve the project's goal whilst recognising nothing is certain.

The competent project manager will be expecting uncertainty and configure his/her project management systems to provide as much early warning as possible of impending changes so as to give the maximum possible time to optimise outcomes. Tools such as the project

^{xvi} For more on this see 'Getting the 'soft stuff' right - Effective communication is the key to successful project outcomes!':

https://mosaicprojects.com.au/PDF_Papers/P055_Getting_the_Soft_Stuff_Right.pdf

^{xvii} See 'The Meaning of Risk in an Uncertain World':

https://mosaicprojects.com.au/PDF_Papers/P040_The_Meaning_of_Risk_in_an_Uncertain_World.pdf

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schedule (and the project scheduler) will need to be predictive and help in pro-active decision making rather than reactive, reporting on what has already gone wrong after the event.

The key skill set of the competent project manager will be identifying and managing stakeholder expectations using tools such as the *Stakeholder Circle*[®] to help identify the project's key stakeholders^{xviii}.

To support these objectives the purpose of documents such as project schedules and cost plans will be redefined from 'control documents' to 'communication documents'.

The paradox is that by dropping the false expectation of control and 'certainty' skilled project managers are likely to consistently deliver more predictable and reliable project outcomes.

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^{xviii} See; <https://mosaicprojects.com.au/PMKI-TPI-075.php> for more on the *Stakeholder Circle*[®]

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