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# The evolution of project management <sup>1</sup>

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As part of a project to develop a new paper *Project Management - A Historical Timeline* (planned for publication in December) there is a need to classify the various phases in the development of the practice of project management. However, almost every author of project management history has a different view of the major change points. The objective of this brief paper is to elicit feedback on the tentative classifications outlined below.

As a starting point, we have adopted Prof. Peter Morris' distinction between the management of projects and project management<sup>2</sup>. People have been managing projects for millennia, whereas project management only started to emerge as a discipline in the 1940s, evolving into modern project management in the 1960s.

The difficulty dealing with the earlier phase of *managing projects* is that the degree of sophistication applied to the management occurred in two major waves, the period from the earliest times through to the collapse of the Roman Empire and then the post Roman period. Both the Greeks and the Romans had skilled engineers and architects and a contracting industry capable of delivering sophisticated projects. The construction of the Long Walls in Athens between 461 and 457 BCE was managed by the architect Callicrates, who let the works to ten separate contractors. Similarly, the Colosseum was built in the first century CE by four contractors. This level of sophistication disappeared for more than 1000 years after the end of the Roman Empire only reappearing in the late Middle Ages and Renaissance.

My take on the major phases of development of project management is driven by fundamental changes in the way the person, or people, responsible for managing the project was appointed. Based on this approach the major phases in the development of project management seem to be:

1. **BCE<sup>3</sup> Collective.** This phase saw the building of the first significant structures such as Göbekli Tepe (founded around 9500 BCE) and Stonehenge (founded around 3000 BCE) as well as the building of the earliest permanent settlements. The work to build the monuments extended over hundreds of years and would seem to have been undertaken voluntarily by groups of people working together, probably as a religious activity.

During this phase, the first permanent settlements were also constructed and specialist

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<sup>1</sup> How to cite this paper: Weaver, P. (2022). The evolution of project management; *PM World Journal*, Vol. XI, Issue XI, November.

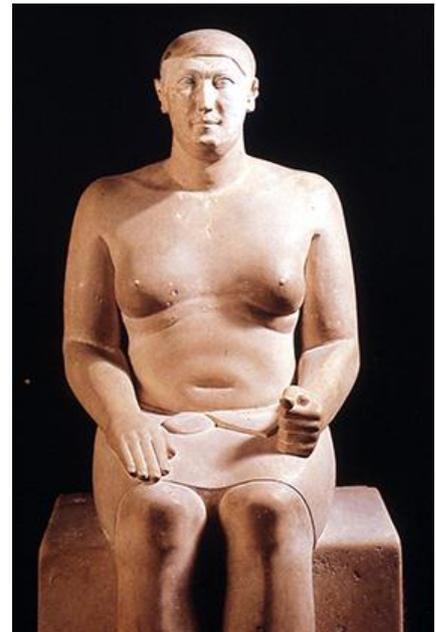
<sup>2</sup> Morris, P. W. G. *The Management of Projects*. Thomas Telford, London 1994.

<sup>3</sup> **BCE** = Before the Current Era (extended in this paper to include the Roman period through to approximately 400 CE).

building contractors emerged. The *Code of Hammurabi*, a Babylonian legal text composed c. 1755–1750 BC sets out six laws relating to building works including “*If a builder constructs a house for a man but does not make it conform to specifications so that a wall then buckles, that builder shall make that wall sound using his own silver.*” Which suggests there were an established group of people who were identified as builders and earned their living building structures for others.

2. **BCE Anointed.** The increasing power of emperors, kings, pharaohs, and priests (collectively *rulers*) over populations, beginning in the early Bronze Age, shifted the way larger projects were commissioned and managed. The *ruler* would decide on the need for a new structure (palace, fort, temple, etc.), arrange the works and fund the project. The *ruler* typically took a direct interest in how their money was being spent but typically employed skilled overseers, scribes and artists to undertake the work. Some of these artisans were clearly highly skilled and capable managers.

Two Egyptian architects are known to history, Imhotep (2667 BCE – 2600 BCE) a brilliant architect, mathematician, physician, astrologer, poet, priest, and Chief Minister to Pharaoh Djoser, and Hemiunu (c. 2570 BCE) a high-ranking official who lived during the reign of Pharaoh Khufu. Hemiunu served as vizier and royal seal bearer to Khufu and one of his many titles was *Overseer of All Construction Projects of the King*, which means among many other projects, he was probably responsible for building the Great Pyramid at Giza.



1 Hemiunu statue at the Roemer and Pelizaeus Museum, Germany

The authority of the overseers came directly from the ruler they served. Depending on the civilization, their workforces varied from slaves, through conscripted labourers to paid artisans and contractors.

3. **BCE Contractors.** This phase is an extension of the *BCE Anointed* phase to recognize the emergence of substantial contracting organizations in the Roman world. The oversight of a project was typically directly tied back to the emperor through appointed officials (usually unpaid), or a patron, but the work was undertaken by a contractor working to a written contract that defined the scope, quality, time and costs for the work. The technical capabilities of the organizations that built the Colosseum and many other Roman structures would not be recreated for over 1000 years.

This phase in the development of the management of projects came to an abrupt halt with the collapse of the Western Empire in the 5<sup>th</sup> century CE.

4. **Anointed.** Following the collapse of the Roman Empire, the way projects were undertaken reverted to the 'anointed' mode. Kings or Bishops would decide on the need for a new castle, cathedral or other facility and either oversee the work directly, or appoint a trusted noble to manage the endeavour. This approach continued into the 17<sup>th</sup> century, for example the construction of the first dry dock at Portsmouth, England, was managed, designed, and built by architect Sir Reginald Bray a trusted councillor of King Henry VII<sup>4</sup>. Work began on 14th July 1495 and was completed by 17th April 1496.

This same general approach to project development was adopted by wealthy private individuals. For example the initial phase of the construction of Hampton Court Palace was directed and funded by Cardinal Thomas Wolsey as his personal residence with works starting in 1514 and completing in 1529, after ownership had transferred to Henry VIII.



2 Hampton Court Palace

Certain overseers are mentioned in the project's accounts such as James Bettes, *master of the works*, Master Lawrence Stubbes, *paymaster*, and Mr. Henry Williams, *surveyor of the works*, the last-named probably more nearly fulfilling the duties of a modern architect than the others; but in no case is it clear that the actual designing was done by any of these. In 1536-7 one Mr. Lubbyns is mentioned as being paid £3 6s. 8d. as a half-year's wages, side by side with an entry for 'paper Riall for plattes' for his use; from which it would appear that he certainly set out details of the work if he did not design them. Similarly extensive use was made of specialist contractors, for example all of the bricks used were manufactured on site. However, the control of the project seems to vest in the owner, Cardinal Wolsey.

5. **Appointed Professionals.** The introduction of accounting practices in the 1430s and the professionalization of engineering, architectural, and master builder roles led to a shift in the way public and private works were managed. Increasingly, a qualified professional was selected either by a competitive process, or based on reputation, and appointed to undertake a project. Some examples include the construction of the world-famous dome of the Cathedral of Florence. At 45.5 meters in diameter and a total height of more than 116 meters, the dome is the largest masonry vault in the world. It was built between 1420 and 1436 by Filippo Brunelleschi, following the delayed acceptance of the proposal he

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<sup>4</sup> For more on the construction of the dry dock, see:  
[https://mosaicprojects.com.au/Mag\\_Articles/AA018\\_The\\_first\\_Dry-Docks.pdf](https://mosaicprojects.com.au/Mag_Articles/AA018_The_first_Dry-Docks.pdf)

presented in 1418, in response to a competition launched by the *Opera* to complete the cathedral. Work on the cathedral had started some 150 years earlier in 1296.

The reconstruction of St Paul's Cathedral after the Great Fire of 1666 used a similar approach. Sir Christopher Wren was commissioned to rebuild the cathedral (and many other buildings) based on his standing and reputation. The rebuilding work did not start until 1673 after several redesigns. The building contractor for the work was the master builder Thomas Strong who worked together with Wren on the project for 35 years. In later years John James, who had been working for Wren on the building of Greenwich Hospital, was appointed senior site manager. However, while Wren personally supervised the building work, visiting the site every Saturday, he was not responsible for paying for the works. Wren received an annual salary of £200 for his involvement through to completion in 1710.

This type of arrangement seems to have been the normal way of managing projects through to the 19<sup>th</sup> century. Most of the early canal and railway projects were built by engineers engaged by a corporation or commercial company for a fee. The engineer, designed, estimated, and managed the works including hiring the workers, but the principle paid the costs<sup>5</sup>.

6. **Appointed Contractors.** The shift to a main contractor taking full responsibility for the works including delivering the agreed scope on time, for an agreed cost seems to be an 19<sup>th</sup> century development. The Institution of Civil Engineers (ICE) was founded in 1818 and the (now) Chartered Institute of Building (CIOB) in 1834. Both were (and still are) member-based organizations, but several of their founding members owned substantial contracting organizations, some of which are still in business today<sup>6</sup>.

One early documented example of this approach was the construction of the Crystal Palace in London for the Great Exhibition which opened on 1<sup>st</sup> May 1851. Sketch plans were approved on the 11th June 1850 and with the 'design' approved, tenders were sought from industry. The proposal from Fox, Henderson and Co was accepted. Work started on the 15th July 1850, possession of site was granted on the 30th July, the first column was erected on the 26th September and the formal contract signed on the 31st October. The building, a glazed structure 1848 feet [563.3 meters] long, 408 ft [124.4 m] wide and 108 ft [32.9 m] high, with a roofed area of 772,784 sq.ft. [71,794m<sup>2</sup>] was completed 8 ½ months later ready for the opening of The Great Exhibition on the 1st May 1851<sup>7</sup>.

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<sup>5</sup> For more on the *early canal and railway projects* see the papers at:  
<https://mosaicprojects.com.au/PMKI-ZSY-005.php#Process2>

<sup>6</sup> For more on the *founding members of CIOB* see: [https://mosaicprojects.com.au/PDF-Gen/CIOB\\_Book.pdf](https://mosaicprojects.com.au/PDF-Gen/CIOB_Book.pdf)

<sup>7</sup> For more on the *construction of the Crystal Palace* see:  
[https://mosaicprojects.com.au/PDF\\_Papers/P180-Project\\_Governance-Building\\_the\\_Crystal\\_Palace.pdf](https://mosaicprojects.com.au/PDF_Papers/P180-Project_Governance-Building_the_Crystal_Palace.pdf)

The use of contractors to manage projects in shipbuilding, construction, engineering and other disciplines seems to be standard practice by the start of the 20<sup>th</sup> century, but no one called themselves project managers at this time.

7. **Paleo<sup>8</sup> Project Coordination and Leadership.** The 20<sup>th</sup> century was characterized by the rapid development of management and financial practices and controls. These developments were initially focused on factories and organizations, but increasingly transferred across to the management of projects. The modern concept of project management as a cross discipline function that required leading, coordinating, or managing started to emerge in the 1920s. Through to the end of WW2, these early project functions were primarily coordination roles, but by the 1950s, the concept of a project manager responsible for delivering a project was becoming more widespread<sup>9</sup>.
8. **Modern Project Management Phase 1 – Convergence.** The concept of project management as a single unified practice capable of successfully delivering most projects, most of the time, emerged in the 1960s and saw a rapid expansion of project management world-wide. The general concepts of project management were defined in a series of standards and guides that were remarkably consistent. There appeared to be one correct way of running all types of projects successfully, which could be described in a series of processes or practices that only needed tailoring to meet the specific needs of each project. Consequently, it was assumed project failure could be overcome by applying the processes more effectively.
9. **Modern Project Management Phase 2 – Divergence.** The publication of the *Manifesto for Agile Software Development* in 2001 started the trend towards divergence in the way projects were managed. By 2010 the International Standards Organization (ISO) recognized project management could not be defined by a set of processes and voted to shift towards an objectives view in the next standard – what project management is supposed to achieve, rather than how the function of managing a project is to be done. By 2020 this approach was embedded in the ISO standards for project management and had spread to many of the other significant guides. The current challenge for project management organizations is working out how to manage the increasing levels of entropy within the practice of project management<sup>10</sup>. Regardless of the approach or methodology used to run the project, the concept of a project, run by a project manager,

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<sup>8</sup> Paleo is used in this context as meaning 'early' or 'primitive'.

<sup>9</sup> For more on the *development of management and then project management*, see the papers at:  
<https://mosaicprojects.com.au/PMKI-ZSY-005.php#Overview>

<sup>10</sup> The various styles of project management that are emerging are discussed in *The Entropy at the Heart of Project Management*:  
<https://www.projectmanagement.com/blog-post/71935/the-entropy-at-the-heart-of-project-management>

to create value for a client was assumed to be consistent. However, even this assumption is being challenged by the increasing projectization of businesses and organizations.

### **Phases of Project Controls**

The evolution of project controls appears to have followed a very different pattern to the changes in the way projects were managed.

1. **Static tools.** From the earliest projects through to the 1960s, the primary control tools used by the person managing the project showed static representations of cost and other deterministic data. The sophistication of both the management data, and its representation in reports improved over the centuries, but the controls processes focused on reactive management actions to correct observed deviations from the plan<sup>11</sup>. The people managing projects (priests, builders, engineers, or other authority figures) were undoubtedly interested in assessing the time and cost needed to complete the project but any determination would be a subjective assessment based on the information to date.
2. **Dynamic tools.** The current phase of development of project controls uses largely deterministic information to predict future outcomes. This phase of development started in the late 1950s with the creation of PERT and CPM schedules, and has progressed through to the point where there is general acceptance that Earned Value and Earned Schedule are among the best of the predictive control tools. This phase saw the creation of 'modern project management' as the pioneers of computer assisted project controls worked together to form the various project management institutes (including PMI in October 1969), and the institutes in turn defined and codified the practice of 'modern project management'. As a result, the people managing projects were increasingly identified as project managers. Project management is now expected to be proactive, working to minimize the negative effect of future problems identified using the predictive tools, as well as dealing with any current negative variances. This phase is directly aligned with *Modern Project Management Phase 1 – Convergence* discussed above.
3. **Intelligent tools.** The next generation of project controls is starting to emerge, these tools are predicted to be integrated, adaptive, and intelligent, with a focus on maximizing the efficient use of the project's resources. They will use machine learning, and be integrated into the systems used to design and develop the project's outputs rather than operating as standalone processes. One example is the emergence of 5D BIM in the construction/engineering industries. A three-dimensional design is integrated with the schedule (4D) and cost information (5D) to provide a single system accessed and used by

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<sup>11</sup> For more on the *evolution of cost engineering* see the papers at:  
<https://mosaicprojects.com.au/PMKI-ZSY-020.php#Process1>  
For more on the *evolution of scheduling* see the papers at:  
<https://mosaicprojects.com.au/PMKI-ZSY-020.php#Overview>

everyone involved in the design, construction, and future maintenance of a building or facility. Project control tools with embedded intelligence are also emerging. These developments are too new to have much impact on the nature of project management today, but by the end of the 2020s we are likely to see as much change in the way projects are managed as occurred in the 1960s.

## Conclusion

Two potential frameworks for describing the development of project management are outlined above. Any feedback or comments on the phase breakdowns will be appreciated.

## Bibliography

The primary resource used in developing this paper are:

***The History of Project Management (2011)*** by Mark Kozak-Holland (Amazon):

<https://www.amazon.com/History-Project-Management-Lessons/dp/1554890969/>

***An Introduction to the History of Project Management: From the Earliest Times to A.D.1900***

by Y.C. Chiu (Amazon):

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***The Management of Projects (1994)*** by Peter W. G. Morris (Google Books):

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## About the Author



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**Patrick Weaver**, PMP, PMI-SP, FAICD, FCIOB, is the Managing Director of Mosaic Project Services Pty Ltd, an Australian project management consultancy specializing in project control systems. He is a Fellow of the Chartered Institute of Building, Australasia (FCIOB) and a Fellow of the Australian Institute of Company Directors (FAICD). He is a member of the PMI Melbourne Chapter (Australia), as well a full member of AIPM, and the Project Management College of Scheduling (PMCOS).

Patrick has over 50 years' experience in Project Management. His career was initially focused on the planning and managing of construction, engineering and infrastructure projects in the UK and Australia. The last 35 years has seen his businesses and experience expand to include the successful delivery of project scheduling services and PMOs in a range of government, ICT and business environments; with a strong focus on project management training.

His consultancy work encompasses: developing and advising on project schedules, developing and presenting PM training courses, managing the development of internal project control systems for client organizations, and assisting with dispute resolution and claims management.

In the last few years, Patrick has sought to 'give back' to the industry he has participated in since leaving college through contributions to the development of the project management profession. In addition to his committee roles, he has presented papers at a wide range of project management conferences in the USA, Europe, Asia and Australia, has an on-going role with the PGCS conference in Australia and is part of the Australian delegation to ISO TC258.

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