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The History Of Project Management

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ABSTRACT

Long before there was an institute for project management, or updated knowledge books and guides on how to manage projects, or even before the existence of Gantt charts, history offers several examples of colossal projects successfully completed. The Pyramids of Giza, Great Wall of China, and Coliseum are all good examples of such projects. Project Management, at its core, is concerned with creating an environment where people can work together to achieve a mutual objective, in order to deliver successful projects on time and on budget. Throughout the history of humanity, humans have been working on improving and refining the practices of project management. The goal of this paper is to present the evolution of project management since ancient times until present times and its outlook in the future by outlining major events and developments throughout history.

Keywords: History Project Management; Project Management; History

INTRODUCTION

Project management has been practiced for as long as humanity inhabited earth. There are many examples in history of challenging projects that were successfully completed, despite all the complexities and uncertainties that could've rendered the project a failure. Many of these projects necessitated an enormous workforce, large scope, many years of work, advanced planning and precise execution. Regrettably, despite all of these monumental achievements, very little documentation of their methods and techniques exists. It's not until the 1950s that organizations have started to apply systematic tools and techniques to complex projects. The U.S. Navy greatly contributed to the formulation and documentation of principles of modern project management methodologies and techniques. There were also other noteworthy projects, such as the Manhattan project, that significantly contributed to advancement of standard practices in modern project management. During the 1960s ambitious projects such as landing a man in the moon further helped in the formation and utilization of tools to manage large scope projects. In the 1970s technological advancement made the creation of project management software possible, via software companies such as Oracle. In the 1980s PCs became affordable, subsequently smaller companies started to use computers for project management. In the 1990s notable project management tools such as PRINCE2 and CCPM commenced. In the third millennium, academia started offering degrees for project management. Moreover, project management theories, tools, and techniques are now mainstream in many organizations and industries. It's not clear exactly what the future holds for project management, but with challenges such as globalization, diminishing resources, and increasing population there is no more fitting vehicle for managing such issues than project management.

PROJECT MANAGEMENT IN ANCIENT HISTORY

If we agree with the definition offered by Project Management Institute that a project is “a temporary group activity designed to produce a unique product, service or result” and that project management is the “application of knowledge, skills, tools and techniques to project activities to meet the project requirements” (Project Management Institute, 2013), then humans have started working on projects since ancient history. Throughout history, ingenious architects and engineers have delivered impressive projects such as the great Pyramid of Giza, The Great Wall of China, the Coliseum, the hanging gardens of Babylon and the Stonehenge to name a few. Those architects and engineers were serving their primary roles of engineers and architects as well as project managers. In order for these projects to succeed, these engineers turned into project managers, had to carefully think about all the processes of the project starting with the initiation and planning phases to execution and monitoring all the way to closing of the

project. For each of these projects, someone had to manage the hundreds to thousands of workers for many years, ensure there was enough supply to sustain the project, make sure the project is on track, and of course, the end result had to fulfill expectations of the commander.

Mark Kazak-Holland argues in his book *The History of Project Management* that Project Management is not a 20th century discipline, but contrary to popular belief, history is filled with many projects that had project sponsorship, project management team, practiced project processes and intuitive understanding of the Nine Knowledge Areas of the PMBok®. The author argues that without a good understanding of all of these principles, such projects would've never succeeded. The book also refutes four misperceptions about historical projects: Historical projects had unlimited budgets without an economic return; Historical projects had a predominant slave workforce; Historical projects had unlimited timelines; and Historical projects had used concepts not associated with modern project (Kozak-Holland, 2011). Reading the book one will understand that current project management is the result of a natural evolution and has been practiced throughout the history of humanity. Incrementally, with the completion of each successful significant project knowledge, skills, tools and techniques advanced paving the way for the next historic project.

Despite all of the great historical projects achieved throughout history, the documentation and historical records of earlier projects is scarce. This can be attributed to a combination of factors. First, educated upper society was more interested in the final result of the project rather than the methodology of creation. It also did not help that the execution of such projects was generally the responsibility of craftsmen who were not necessarily educated or interested in making their methods known to others. To the contrary, in many of these projects, the execution details were kept a secret among a certain tribe or family who were specialized in craftsmanship and transmitted from one generation to another (PM Karma, 2008). In his book *A History of Ancient Project: From Mesopotamia to the Roman Empire*, Y. C. Chiu offers a reasonable rationalization for the lack of documentation. The author asserts that professions such as architecture, medicine, economics, mathematics, and theoretical science are all better documented than project management "because the term *project* is not prevalent in ancient texts, the field of project has been more elusive than these other professions (Chiu Y. C., 2011)".

MODERN PROJECT MANAGEMENT: WHEN DID IT ACTUALLY START?

There seems to be no agreement on when exactly modern project management actually started. Different authors have offered different opinions as to how and when modern project management started. This paper, will iterate the different opinions offered on the start of modern project management.

In his book, *An introduction to the History of Project Management: From the Earliest Times to A.D.1900*, Y. C. Chiu, proclaims that both Henri Foyal and Henry Gantt are the forefathers of Project Management (Chiu Y. , 2010). While some may disagree with this statement, many will agree that both Fayol and Gantt have made significant contributions to the management field. Henri Fayol (1841-1925) was a French engineer in an iron and steel company. The company was the largest in France, and was crucial in the rearmament of the French army during the decade right before World War I. Fayol successfully lead the company for many years, during which he became increasingly interested in the problems of management (Witzel, 2003). Through observation, Fayol identified five functions of management, which he believed are universal. Fayol believed that every manager performed these functions, within varying degrees, on their daily work. Fayol's five functions of management are: planning, organizing, commanding, coordinating and controlling. Fayol also formulated 14 principles which give guidance to managers on how to execute those five managerial functions effectively. Fayol's work was criticized by many due to their belief that the theory does not convey the true managerial complexities faced by managers in their daily work. Nevertheless, Fayol's work made significant contributions to management. The paper *Fayol stands the test of time*, for example, "argues that Fayol's elements of management are not refuted but are rather reinforced by more recent findings. The paper concludes that Fayol's work stands the test of time (Fells, 2000)". Despite the shortcomings, the five functions still give a structured overview of tasks that are important to management, and provide an initial overview of the main functions managers experience on daily basis.

The second forefather of modern project management, according to Y. C. Chiu, is Henry Gantt. Henry Gantt (1861 - 1919) was an American engineer and later on a management consultant. He is best known for

developing the Gantt chart. Gantt charts are significant in the history of modern project management, because they recognize the benefits of breaking large projects into smaller manageable tasks. They also account for the fact that some tasks may depend on each other. Gantt charts are still in use today and are considered a vital tool in a project manager's toolkit. Although the charts bear Gantt's name, it's arguable that Gantt charts were actually developed much earlier by a Polish economist named Karol Adamieckic. In 1986 Karol Adamieckic invented what was then a novel method to visualize interdependent processes. He called it the Harmonogram. Unfortunately for Adamieckic, he only published his articles in Polish and Russian and, hence, his invention was not widely recognized or adopted in the west (Marsh, 1975). In the west, Henry Gantt designed his charts around 1910 – 1915, and the charts were later used in large projects in World War I and the construction of Hoover Dam, which contributed to their adoption and wide use. Consequently, the charts became associated with his name.

According to Snyder and Kline (1987), modern project management era only started in 1958 with the development of CPM/PERT (Y. H. KWAK, 2003). CPM/PERT have rightfully been given importance in the advancement, and arguably the start of modern project management. Although somewhat overlapping, CPM/PERT have been developed along two parallel lines in two very different fields: the navy and the chemical industry. In 1958, the U.S. navy led the Polaris project, the first submarine-launched ballistic missiles (SLBM) carrying nuclear warheads. Through the Polaris project, the U.S. navy is credited for developing one of today's most widely used technique is Program Evaluation Review Technique (PERT). Due to the high complexity and uncertainty associated with the scheduling of the project, PERT was well-suited to visualize the different scheduling scenarios of the project. The Critical Path Method (CPM) was invented almost simultaneously with PERT. The creation came as a result of E.I du Pont de Nemours Company, undertaking a major construction project. The project involved the building of a major chemical plant. The CPM came as a result of the company needing to accurately estimate the cost and time of the project. Originally, the method they developed was referred to as Project Planning and Scheduling (PPS), but later the technique was developed into the now infamous CPM method.

THE FOUR PERIODS OF MODERN PROJECT MANAGEMENT

In an effort to better capture the history of modern project management, in 2003 Kwak identified four periods in the history of modern project: prior to 1958, 1958 – 1979, 1980 – 1994, and 1995 to present (Y. H. KWAK, 2003). Kwak asserts that the origins of modern project management started between 1900s and 1950s. During that period project management transformed from a Craft system to Human Relations Administration. At that time, better transportation and telecommunication systems allowed for higher mobility and speedy communication. Gantt charts were also developed and in use at that time. It was also during that time that the concept of job specification, which is specifying knowledge, skills, and abilities needed to successfully perform a job. Important projects from that period are Hoover Dam, Interstate Highway and Manhattan project. Gantt Charts were first used in Hoover Dam and then in the Interstate Highway projects. The Manhattan project on the other hand, was particularly important because many still consider it the beginning of modern project management. The Manhattan Project “exhibited the principles of organization, planning, and direction that influenced the development of standard practices for managing projects.” (Shenhar A., 2007).

In the second period as defined Kwak, there was significant technology advancement. The main theme in the second identified period, between 1958 and 1979, is the application of Management Science. During that period, significant technological advancements took place. One such advancement was the introduction of the first plain-paper copier by Xerox. It was also during that time that core project management tools such as PERT and CPM commenced. Another important development during that time was also mandating the use of Work Breakdown Structure (WBS) approach for any future projects bearing the size and scope of Polaris. On the professional side, the institutionalization process of project management began with the creation of the world's first project management association, now known as the International Project Management Association (IPMA). Since its development in 1965 IPMA has grown substantially and is now prime international promoter of project management in Europe, Asia, and Arab countries. Four years later, the Project Management Institute (PMI), which is primarily based in the U.S.A, was founded. PMI is widely known as the publisher of The Project Management Body of Knowledge (PMBOK). The book is a compilation of processes and knowledge areas generally accepted as best practice within the project management discipline (ITRM Guideline CPM 110-01, 2006).

Furthermore, the period was rich with important computer technology developments. In the 1970s, computers progressed from mainframe to mini-computers which made computers more affordable. The affordability of the mini-computers subsequently facilitated the emergence of several project management software companies and tools (Azzopardi, 2014). Polaris and Apollo are considered significant projects from that period. As mentioned earlier, it was during the Polaris project that the navy developed PERT, a core project management tool even today. Apollo was NASA's first formal system of project management in response to the need for standards in managing the complex, expensive and ambitious plan to land a man on the moon. Referring to the project management as a critical component of Project Apollo's success in November 1968, Science magazine, the publication of the American Association for the Advancement of Science, observed "in terms of numbers of dollars or of men, NASA has not been our largest national undertaking, but in terms of complexity, rate of growth, and technological sophistication it has been unique. . . . It may turn out that [the space program's] most valuable spin-off of all will be human rather than technological: better knowledge of how to plan, coordinate, and monitor the multitudinous and varied activities of the organizations required to accomplish great social undertakings" (Wolfe, 1968).

In the third era, 1980 to 1994, multitasking Personal Computers (PC) made an impact on many aspects of work and business including project management. The efficiency of PCs allowed for developing software capable of handling and organizing complex data required to manage projects. In the 1980s project management programs were mostly based on the Projects Resource Organization Management Planning Technique II (PROMPT II) model of project management, which was later refined into the PProjects In Controlled Environments (PRINCE) model (Bizness Académie, 2012). Another significant development during that time was the Theory of Constraints (TOC), which is a management philosophy introduced by Eliyahu M. Goldratt in his well-known Novel "The Goal". The philosophy is aimed at helping organizations continually achieve their goals using the premise that the rate of goal achievement by a goal-oriented system is limited by at least one constraint (Cox & Goldratt, 1986) . In 1986, Scrum, an agile software development model encouraging software development by multiple small teams was developed. Scrum's approach is a flexible, holistic product development strategy where a development team works as a unit to reach a common goal "as opposed to a "traditional, sequential approach" (Nonaka, 1986). In 1987, PMBOK® was published by PMI, the book was mostly based on a white paper called published in 1983 called the "Ethics, Standards, and Accreditation Committee Final Report". The guide was an attempt to document and standardize accepted project management and practices. The PMBOK® guide has become the global standard for the industry. In 1994 the Standish Group published the CHAOS report, which is a collection of information on real project failures in Information Technology (IT). The objective of the group is making the industry more successful by profiling projects and environments against the collected cases and delivers advices based on collective wisdom.

Kwak presents three projects from the third era that illustrated the application of high technology and the project management tools and practices of the time. The featured projects are The English-France Channel project (1989-1991), Space Shuttle Challenger project (1983-1986), and The XV Calgary Olympic Winter Games (1988). "The English-France Channel project was an international project that involved two government agencies (British and French government), several financial institutions, engineering construction companies, and other various organizations between the two countries. The project goal, cost, schedule, and other factors needed to be adjusted to conduct the project. The language, use of standard metrics, and other communication differences needed to be coordinated". The disaster of the Space Shuttle Challenger focused the attention of the project management community to risk management, group dynamics, and quality management. Finally, The Calgary Winter Olympic game in 1988 was an example of successful event management (Y. H. KWAK, 2003).

The fourth and final era Kwak presents is 1995 to present (in this instance the present refers to 2003, which is when the book was written). In this era technology continues to be a driving force for change, and greatly impacts what project managers do. In 1996 PRINCE was upgraded to PRINCE2, and soon after in 1997 an alternative method called the Critical Chain Project Management (CCPM) was introduced. CCPM is a method of planning and managing projects developed by Eliyahu M. Goldratt. It is derived from TOC, and unlike CPM and PERT the method mainly emphasized resources required to complete the project rather than the specific tasks (Goldratt, 1997). In 1998 both The American National Standards Institute (ANSI) and Institute of Electrical and Electronics Engineers (IEEE) recognized PMBOK® as a standard. In 2001 The Agile Manifesto was written. The Agile

Manifesto is founded upon a set of core values that are aimed at enabling software developing teams to perform well as a team.

PROJECT MANAGEMENT POST THE FOURTH PERIODS

The field of project management continues to evolve. With ongoing standardization of processes, refinement of concepts, and development of software and applications, project management is becoming more of a science than art. A significant advancement to the field is the development of the Total Cost Management (TCM) method. TCM as defined by the AACE International (formerly Association for the Advancement of Cost Engineering) is a “systematic approach to managing cost throughout the life cycle of any enterprise, program, facility, project, product or service”. In the scope of a project, TCM is a set of practices and processes an organization applies to govern the cost in the life cycle of a project. The TCM approach is based on the Plan Do Check Access (PDMA). The PDMA model uses an iterative approach to arriving at clearly defined repeatable processes. In its third edition of the PMBok®, PMI adopted the PDMA method in 1996 right after AACE’s publication of the concept (Hollman, 2006).

In 2008 a fourth edition of the PMBok® was published. Within the same year Software as a Service (SaaS) became ubiquitous. The idea behind SaaS is that organizations can have access to a software for a fee, usually pay per use or monthly fee that end up being less than the licensing fees, without worrying about the hassle of installation, maintenance or hardware requirements. The software is hosted remotely and delivery is made possible through the cloud. Cloud providers are responsible for handling the infrastructure that supports the software (Armando Fox, 2014). Subsequently, SaaS became synonymous with Storage as a Service. Storage as a Service is a similar model to Software as a Service, where large businesses can rent storage space from their infrastructure to others. The space is often used for backup, and it offers a good option for small to mid-sized companies that may lack resources such as personnel, hardware and physical space for a reliable backup service. This business model is touted as the future of application usage. Presently, XaaS refers to any type of service offered through the cloud, where X refers to the service being offered (Rouse 2010).

According to the Global Accreditation Center for Project Management education programs, in 2009 “U.S. News and World Report had ranked project management as the third most valued skill by employers, behind only leadership/negotiation skills and business analysis” (Project Management Institute, 2013). The demand is increasing for project management as a core competency in various fields such as Information Technology, engineering, business, health care, education, construction and manufacturing. Academe responded by offering several programs and degrees in project management designed to prepare prospective project managers with the knowledge and tools that can allow them to succeed in all phases of project management. In the same year, PRINCE2 was refreshed. The major changes to PRINCE2 are the two guides for PRINCE2, which are role specific. The first guide is *Managing Successful Projects with PRINCE2*, which is a guide intended for people managing projects on daily basis. The second guide is called *Directing Successful Projects with PRINCE2*, which is a guide designed for directors or sponsors of projects (Office of Government Commerce, 2009).

Communications technology is now ubiquitous and affordable, which makes it increasingly easier to work from home or other places. The phenomenon of the virtual worker has become mainstream, and chances are it’s not going anywhere soon. According to U.S. news, in 2010, 3.4 million people, equivalent to 9.4% of U.S. workers, worked from home at least one day a week, compared with 9.2 million people, or 7% of U.S. workers in 1997 (Shah, 2013). In some instances, it is a necessity to accommodate for employees to work virtually, while for others it’s a welcomed convenience, because it creates a win-win situation for the business as well as the employee. On the other hand, as more businesses adopt a more collaborative virtual workspace, challenges in aspects such as leadership, trust, control, and communication are amplified, with communication being the top challenge (Osman, 2011).

THE FUTURE OF PROJECT MANAGEMENT

As there was no consensus on the beginnings of project management, there also is no consensus on the future of project management. Depending on the article or source you read, there are conflicting predictions when it

comes to the future of project management as a profession. Some researchers argue that future project management positions will be a thing of the past and there will no longer be a specific project manager role in organizations. The job of a project manager will disintegrate and become a work skill that is part of many required job responsibilities (Stanleigh, 2010). On the other hand, others have argued that project management has become professionalized, and requires special type of skill set for effective project management. The industry has recognized the need for these unique skills and as a result, now requires specialized training and credentials such as the Project Management Professional (PMP) certification (Nelson, 2012). A report published by the Project Management Talent Gap Report provides a much glossier picture for the outlook of project managers. The assessment in the report is that “between 2010 and 2020, 15.7 million new project management roles will be created globally across seven project-intensive industries”. Consequently, there will be a high global demand for project managers, which makes the project management profession very desirable (Project Management Institute, 2013).

As the dynamics and environment of organizations evolve, the challenges of future project managers will follow suit. With large complex projects, it’s becoming a necessity for the project manager to coordinate multi-disciplinary knowledge, and to effectively accomplish the undertaking, project managers will have to adapt to new technologies and learn which specialized intricate tools will work best for each project. Another challenge for project managers will be cutting through the ceaseless sea of information by filtering abundant data and capturing the right information. The challenge for future project managers will be understanding the big picture and effectively communicating with others. Having to work across-networks, with people in different countries, and people who come from different cultures will only compound the complexity of effective communication for future project managers.

Project managers will also have to acclimate to the changing demographics of the workforce, such as the retirement of baby boomers, immigration flow change, and the number of young professionals entering the workforce. The retirement of baby boomers, will make it harder for employers to find talent for vacant positions, which will give talented employees more bargaining power. Finally, project managers will also have to adapt to shifting organizational structure. Globalization, limited resources, stakeholders, competition, economics and many other factors are contributing to the transformation of organizations and business environment (Construction Industry Institute, 2014). The one certain thing in the future is that in order to succeed, project managers of the twenty-first century have to be adaptable to constant change, uncertainty and disruptions.

CONCLUSION

Understanding the past, gives us a chance to better understand the future. Studying the history of project management, one will understand that project management has evolved throughout history. Its continuous involvement facilitated the advancement of project management, and hence paved the way for the next big project. In spite of the numerous substantial projects in history, there is little documentation of the methodologies or techniques before the 1950s. Advancements in science and technology expedited the progression of project management as a profession. It is now widely accepted that a project manager requires a special set of skills. As organizations evolve, so will the challenges facing future project managers. However, while the future may require future project managers to adapt by learning new specialized skills, the fundamental elements that make a project manager a great one will not change; leadership, pragmatism, decisiveness, communication and foresight to name a few.

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