Success Factors of Project Management.

Raj Gandhi [1], Aniket Jadhav[2], Ashwin Chougule[3]

[1,2,3]*Student, Dept. of Mechanical Engineering, Bharati Vidyapeeth College of Engineering, Navi Mumbai*

Abstract: *Project management is the technique of applying various skills, knowledge, methods, processes and experiences to achieve the aim of project management. It can significantly improve the quality, sustainability, while consuming less time to achieve it. Apart from project management, non-technical (management) skills also play an important role since the project outcomes are expected to be ethical, eco-friendly as well as economically sustainable during its life time. Therefore achieving success in project management is an important parameter from scientific as well as practical point of view. Achieving success means to reach the required goal in the fixed time frame. In this paper we have evaluated various factors used for project management and discussed how important role it plays in deciding its success. It also consist evaluation of a case study based on the success factors mentioned in this paper.*

Key words: Project Management, Success factors, History of project management, World War 2, Manhattan Project.

1.INTRODUCTION

A project is temporary endeavor to produce unique product, result or service. Unlike business operations which are repetitive and permanent production activities, a project is temporary in nature. The management of such distinct production approach requires development of distinct technical skills and management strategies. Project management is fundamental for attaining the final results of a project, manage its contributors and outcomes, as well as drive and assess the alternatives in order to fulfill the different stakeholder's needs[5]. Project management is the application of knowledge, skills, tools and techniques to project activities to meet the project requirements (Project Management Institute, Inc., 2008). In practice, project management is difficult, from both theoretical and practical perspective. From theoretical perspective, fundamental planning problem of resource constrained scheduling is not tractable. From practical perspective, three standard objectives in project management are defined to be completion on time, in budget and with acceptable quality. Yet many projects fail to meet this criteria despite of detailed planning. The rate of failure of project is higher in many modern applications due to less reliable data and more challenging characteristics of projects. Projects may succeed and fail in terms of how they reach their goals and how they are managed. The achievement of project goals requires efficient project control. Recently, researchers have become increasingly concerned with sustainability as a project goal and as a characteristic of the process through which the project is managed.

While considerations about project management success, it is possible to find and use many different criteria. Oilsen almost 50 years ago suggested cost, time and quality (iron triangle model) as the success criteria. Wright reduces that list and suggests only time and budget are of importance. Many writers agree that cost, time and quality are success criteria, but not exclusively. Besides iron triangle and taking into account considerations of project management success, it is important to look for different approaches. It is surely possible to broaden the model that anticipates stakeholder's satisfaction, benefits to organization and long term impacts on project environment. Project success became a relevant project management topic and is one of the most frequently debated issues [5]. Nevertheless, there is a lack of consensus regarding the criteria by which success is evaluated.

2.LITERATURE REVIEW

HISTORY OF PROJECT MANAGEMENT:

In every civilization we had seen that Projects management is formal managerial discipline, also it is an organized activity of people[9]. We can find the roots of modern project management in the second half of the 19th century, with the rising complications of the business world. Modern Project management was started in middle of the 20th century[7]. Up to the 1950 USA managed projects on an ad-hoc basis, using Gantt charts which is an informal technique and tool for project management[7]. By the turn of the century, scientist Frederick Taylor started detailing his studies of work. Taylor applied scientific reasoning to work and concluded that when labors elementary needs are studied then we will able to analyze and improve labour condition[9]. Scientist Henry Gantt, Taylor's associate studied in great detail to determine the order of operations in work and he made Gantt charts. Gantt charts proved to be an important analytical tool for managers to determine the order of operations in work. Overview of Gantt chart had been not changed for nearly a century.

Another two important tool used for project management which are "critical path method"(CPM) and "program evaluation and review technique" (PERT), when managing plant maintenance projects two companies DuPont Corporation and Remington Rand Corporation developed the CPM[8]. PERT was discovered by the U.S. Navy Special Projects Office in cooperation with the two companies Lockheed Corporation and Booz Allen Hamilton as part of developing Polaris missile submarine program[8]. PERT and CPM both are same but there is small difference between them which is CPM is used when time for each activity is predefined and known while PERT used when time at which each activity will be carried out, will be varied[8].

In the history of project management one of the greatest research and development project was "The Manhattan Project" of building the first atomic bomb during World War II, also in that Manhattan project they are not used Work Breakdown Structures or network scheduling. these project described the various principles of organization, planning, and direction to describe modern practice of managing projects. In 1986 Karol Adamiecki developed the theory of work harmonization which is also important in the project management[9].

Project success was considered as completion of projects according to time, cost and quality; these three things are known as the golden triangle (Jugdev & Müller 2005; Ika 2009)[10]. This triangle was widely accepted but also triangle was unable to fully define project success (Dvir et al 1998; Milis et al 2003; Ika 2009)[11]. Completion of project according to golden triangle criteria does not mean that project is successful (Turner & Zolin 2012). For example, the F-20 aircraft project was completed according to the golden triangle, but project not successful and not any one aircraft was sold (Martin & Schmidt 1987).

In 1988 De Wit developed the concept of project success by splitting project management into two parts: in which first part was product success, and second part was success of project management (meaning the managerial processes). De Wit said that product success determined separately from the success of project management activities. He concluded that Successful Project management activities are not a guarantee for a successful product and for successful product it is not necessarily the result of good PM activities. Example, for constructing Sydney Opera House required large amount of cost and this project was delayed by much more time but it is a world renowned product (Ika 2009).

3. PROJECT MANAGEMENT SUCCESS FACTORS

The success of project is identified as "completing the project within the constraints of scope, time, cost, quality, resources, and risk as approved between project management and senior management" and the project manager is responsible of successful project completion. The success of a project depends on several factors such as project management itself, business planning, skillful leader, human resource management, teamwork, communication skills[1].

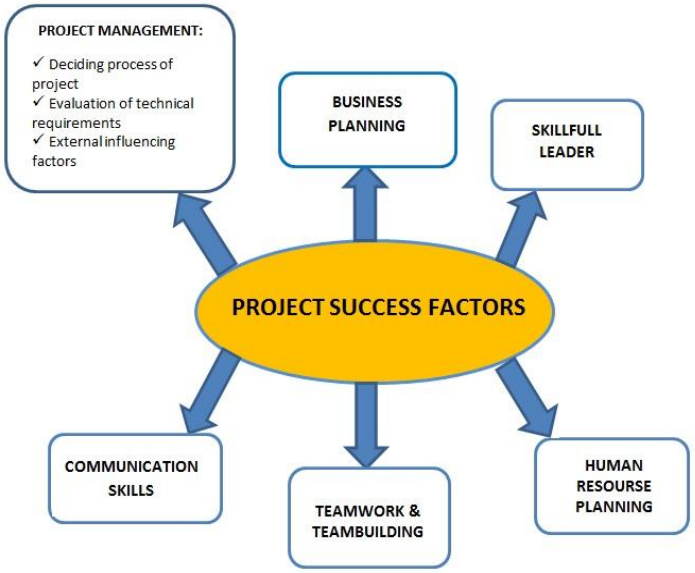


Fig-1 Project Success Factors

3.1 Project management

The first major factor on which the success of a project depends is the careful project management . The project success rate is increased significantly through applying knowledge, skills, tools, techniques and experience to project activities. The various objectives of project management include enhancement of the built environment, preservation of the natural eco-system and habitat, end users comfort and satisfaction. It can be further evaluated in further categories[2]:

3.1.1 Deciding project process

This step is involved in deciding the process which need to be followed to complete the project based on the requirement of customer and convenience of the manufacturer. While deciding the process the manufacturer must evaluate the quality, cost and time required for the project.

3.1.2 Evaluation of technical requirement

This step involves finding the technical requirement needed based on the project process selected. It involves procurement of tools, machines, project site and technical labors needed to complete the project.

3.1.3 External influencing factors on project management

External factors are also needed to be considered as they play an important role in successful completion of the project. They include influence due to political factors, regimes or effects of climatic changes(especially in construction project) which decide the success of the project. Generally these factors are not in control of the organization.

3.2 Business planning:

This factor totally deals with the business related evaluation based on the benefits and returns to the stakeholders. It involves checking how well the aim of the project has being achieved and in what ways it can maximize the stakeholder's returns and benefits. It includes forecasting to know the future needs of the project, using various operation research models to maximize the profits to the stakeholders.

3.3 Skillful leader:

This is a critical factor because the success of the project will depend upon the decisions taken by the leader of the organization. Leaders are the one who influence and inspire people to action. They provide a long-term vision and goals for the organization and rally people around those goals. "Leaders shape values and culture and role model behaviors of the people". So it is important for a leader to be knowledgeable, skillful, good decision maker and a team player who carries all the responsibilities of the team and always work towards the betterment of the organization.

3.4 Human resource planning:

The next factor is human resource planning. According to the PMBOK, "human resource planning is used to determine and identify human resources with the necessary skills required from project success." . The roles and responsibilities, reporting relationship, and staffing management should be clearly described in the human resource management plan. Apart from technical team requirement there is a need of management team for the organization. If technical team is the producer than management teams is the seller, both play equal role in an organization. If they fail to do their job then it will directly affect the returns and benefits to the stakeholders. So human resource planning plays an important role in deciding success of a project.

3.5 Teamwork and teambuilding:

Teamwork is an essential part of workplace success. Teamwork involves building relationships and working with other people using a number of important skills and habits such as Working cooperatively ; Contributing to groups with ideas, suggestions, and effort ; Communication (both giving and receiving) ; Sense of responsibility ; Healthy respect for different opinions, customs, and individual preferences ; Ability to participate in group decision-making. For example, team members in the workplace plan ahead and work cooperatively to assign tasks, assess progress, and deliver on time. They have professional discussions during which differing approaches and opinions might be shared and assessed in a respectful manner. Even when certain employees end up with tasks that were not their first choices, jobs get done with limited complaints because it is in the spirit of teamwork and with the overall goal in mind. Due to so many reasons it is a crucial factor deciding the success of a project.

3.6 Communication skills:

Communication plays a fundamental role in all facets of business. It is therefore very important that both internal communication within any organization as well as the communication skills of the employees are effective. Effective Communication is one of the prominent factor for the development of an organization. It is something like a tool to the managers to perform the basic functions of management such as Planning, Organizing, Motivating and controlling the team effectively. Communication skills whether written or oral form the basis of any business activity. Thus, effective communication can be said as the building block of an organization. It is like a closed loop process, if one group fails to communicate certain task then it will affect all the other groups in an organization. So in every project or organization it is necessary to have skilled communicators for increasing the success possibility of a project.

4. CASE STUDY:

In times of war when country is in total turmoil; the patriotism, responsibility and duty of the citizen brings the whole nation together as one team to defeat their common enemy and bring stability to the country. In these times there is fierce competition between the nations to develop new technology which can help win the war. So here we

are going to evaluate one of the successful project of the century, which lead to deaths of thousands but put an end to the war-'The Manhattan Project'[3].

During WW2, there was a fierce competition between many countries to develop the first atomic bomb. The development of this technology could directly shift the power to that side, so Axis nations and Allied nations both, developing theories, technology, getting manpower and investing billions of dollars in funding to complete the project in a limited time and to become a superpower. Amongst them, two rivals USA and Germany started fiercely working towards the project. USA, under the leadership of General Leslie Groves who was responsible for gathering team of scientist and engineers, setting up laboratories and test sites, managing the funding and selecting a leader of the technical team, Prof. Robert Oppenheimer who played a vital role in making the project successful under the limited time, while on other hand Germany was under the leadership of Werner Heisenberg one of the greatest scientist of Germany. In the following table we will evaluate the factors which made the Manhattan Project Successful.

4.1 Evaluation of Case Study based on Success Factor

Sr. No	Success Factors	Evaluation of the Project	Success Indication
1.	Project Management	✓Deciding Project process- According to the science and technology developed during that time, nuclear fission process was used. Since fission was in the initial process of development a lot of R&D was needed to make it fully functional. ✓Technical requirements- Uranium 235 and plutonium was needed for fission and it was very difficult to extract it in its pure form, so various plants, laboratories was set up along with the technical team of scientist and engineers. ✓External Influencing Factor- A lot of political pressure was put on general groves and Robert Oppenheimer to complete the project on time and end the war because they were losing lots of American lives in the battlefield.	Due to the execution of all these factors such as selecting right process, gathering required material, proper financial planning, having a skillful leader, having a hardworking team lead to success of the Manhattan Project.
2.	Business Planning	The major aim of the project was to develop an atomic bomb and to end the war, but for this to happen financial/business planning was important. Funds from the government needed to be distributed/channelized accurately to various departments under the project.	
3.	Skillful Leader	This was the major factor deciding project success. Under the leadership of General Groves and Robert Oppenheimer, the project which was considered impossible was completed within 35 weeks from its inception. Their knowledge, decision making skills, foresight and planning increased the probability of making the project successful.	
4.	Human Resource Planning	After sanctioning of the project General Groves travelled to every major university in USA to gather a team of scientist and engineers and explained them their roles and responsibilities towards the project. Apart from a good leader it is important to have a good and responsible team, in this project each and every individual have completed their role and lead it to success.	
5.	Teamwork and Teambuilding	A team of scientist and engineers from different backgrounds fiercely working day and night, discussing problems, finding solutions, cooperatively working with each other showed their teamwork and dedication towards the project.	
6.	Communication Skills	As mentioned earlier scientists and engineers were from different backgrounds from various parts of the nation, they had to share ideas, discuss solutions, so their communication skills had to be perfect.	

The reason Germans failed to achieve their target was they did not have a centralized facility to work under one roof, a skillful but demotivated leader as he was working for the Nazis, no proper planning and funding lead to failure of their project.

5.CONCLUSION:

As we have seen, the success of the project depends on various factors which are interrelated to each other that is failure of one may lead to failure of entire project. Apart from technical skills in a project, non-technical skills such as business planning, teamwork, communication skills and specifically management skills play a very important role in deciding its success. From the case study we can observe that if Germany would have been succeeded in developing an Atom bomb then the world would have been totally different today, but thanks to better management skills, good leader and a dedicated team lead to a successful project and put an end to the war.

6.REFERENCES:

[1]Increase the projects' success rate through developing multi-cultural project management process ,Ipek Sahra Ozguler, Istanbul, 34377, Turkey.

[2]The four-level project success framework: application and assessment Eskander Howsawi, College of Engineering at Al Lith, Umm Al-Qura University, Makkah, Saudi Arabia David Eager, Ravindra Bagia and Klaus Niebecker, Faculty of Engineering and Information Technology, University of Technology Sydney, Australia DOI: http://dx.doi.org/10.5130/.v1i0.3865.

[3]An Analysis of Success and Failure: The Manhattan Project and German Nuclear Research during the Third Reich, Jon Tate Self, Ouachita Baptist University.

[4]Project Management Success Factors Mladen Radujkovića, Mariela Sjekavicab* a University of Zagreb, Faculty of Civil Engineering, Fra Andrije Kačića Miošića 26, Zagreb 10 000, Croatia a Alma Mater Europea ECM, Slovenska ulica 17, Maribor 2 000, Slovenia b Croatian water, Ulica grada Vukovara 220, Zagreb 10 000, Croatia.

[5]Improving project success: A case study using benefits and project management, Jorge Gomesa*,Mário Romãoa, aISEG- Lisbon School of Economics and Management, Universidade de Lisboa, Lisboa, Portugal.

[6]Determining Critical Success Factors of Project Management Practice: A conceptual framework Zarina Alias*, E.M.A. Zawawi, Khalid Yusof, Aris, NM Centre of Studies for Construction, Faculty of Architecture Planning & Surveying, Universiti Teknologi MARA, 40450, Shah Alam, Malaysia.

[7]INTRODUCTION TO PROJECT MANAGEMENT-By Duncan Haughey.

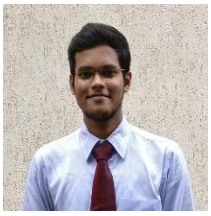
[8]https://en.m.wikipedia.org/wiki/Project_management.

[9]Shenhar, A. & Dvir, D. (2004). Project management evolution: past history and future research directions. Paper presented at PMI® Research Conference: Innovations, London, England. Newtown Square, PA: Project Management Institute.

[10]JUGDEV, K. & MÜLLER, R. 2005. A retrospective look at our evolving understanding of project success. Project Management Journal, 36, 19-31.

[11]DE WIT, A. 1988. Measurement of project success. International Journal of Project Management, 6, 164-170. http://dx.doi.org/10.1016/0263-7863(88)90043-9

BIOGRAPIES:



Raj S. Gandhi currently studying as a student in Bharati Vidyapeeth college of engineering, kharghar. His field of interest are Industrial Engineering, Mechatronics, Mechanics of solids and Heat transfer.

Aniket Babaso Jadhav currently studying as student in bharati vidyapeeth college of engineering, kharghar. His field of interest are Operation Research, production engineering and machine design.

Ashwin D. Chougule currently studying as a student in Bharati Vidyapeetjh college of engineering, kharghar. His field of interest are Production planning and control, Machine design, Mechanics of solid and Fluid mechanics.