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Research Paper

Project management in the construction industry

Marjan Khedmati

Master student, Department of Civil Engineering, Faculty of Engineering Islamic Azad University, Pardis Branch, Pardis, Iran.

Abstract

Project management is the planning and guidance of the project in terms of time, cost and quality to achieve a goal. Project management includes planning, organizing, supervising, and directing activities, and strives to deliver the desired and expected results at the agreed cost at the right time, using the right resources. Project management is the application of the necessary knowledge, skills, tools and techniques in the management of the implementation of activities, in order to meet the needs and expectations of those in charge of project implementation. Project management uses two powerful arms of project planning and control to implement this important.

Keyword: Project Management, Civil Engineering.

Introduction

Project

A set of separate and interrelated actions to achieve a goal. Every action has time and price. In the simplest case, every action has a time and a cost; but in general, the cost of each operation is a function of time. Project management means: Achieving the project goal (doing the project) with the best quality at the best time and at the best cost (1-5).

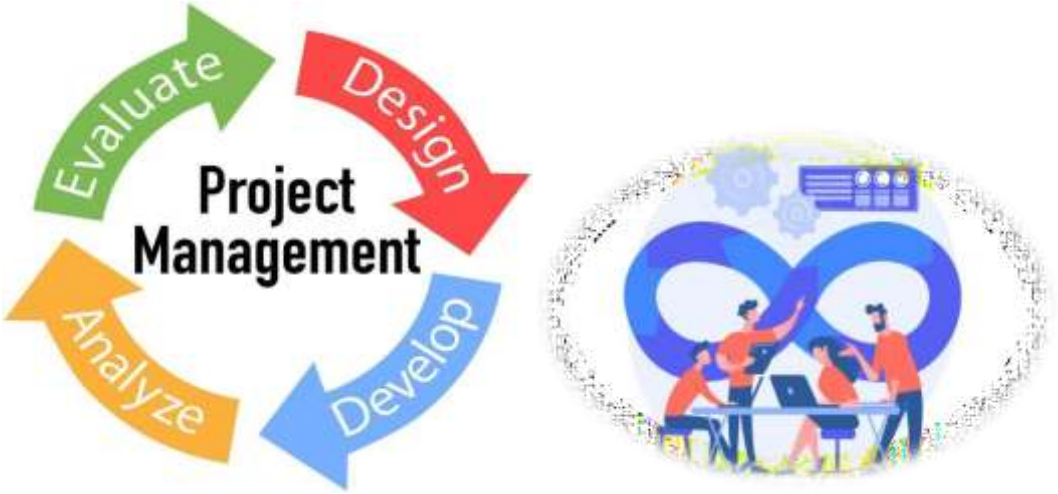

Figure 1 Project Management

Project management, planning and directing the project within the framework of specific time, cost and quality towards creating specific results. Project management includes planning, organizing, supervising, and directing activities, and strives to deliver the desired and expected results at the agreed time at the right time, using the right resources. In other words, project management is the application of knowledge, skills, tools and techniques in managing the flow of activities, in order to meet the needs and expectations of those in charge of project implementation. Project management uses two powerful arms in project implementation and project control (6-8). But the effective factors in the cost of an operation can be mentioned as follows:

- Amount of consumables
- Freight transport
- Rental of equipment and tools
- work duration
- Number of required personnel

Project control is a process to maintain the project path to achieve a justified economic balance between the three factors of cost, time and quality during project implementation, which uses its own tools and techniques to do this. In fact, control is the precise and complete implementation of the program developed for the project so that when leaving the program, by identifying the causes and planning of the most economical activities, the project can be returned to the nearest possible state in its original path (9,11,12). Project control in this way uses the following three factors:

- Time management
- Cost management
- Time-cost optimization

Figure 2 Project Management Factors

Steps to managing project time or cost

- PLANNING
- SCHEDULING
- CONTROLING

Figure 3 Steps to managing project time or cost

Activity planning is purely human.

Planning technique is project chart and network structure (10).

The scheduling technique is the critical path (CPM) method and the cost-time optimization of the project.

The technique is control, data collection, reporting, analysis, and scheduling modification (13-16).

Planning

Identify and define actions to achieve the project goal (prepare a list of actions) - Order of actions (simultaneous, series, parallel)

- Determine the important factors in each action

- ❖ Prepare a WBS project chart
- ❖ Draw a project network

Figure 4 planning

Work breakdown structure

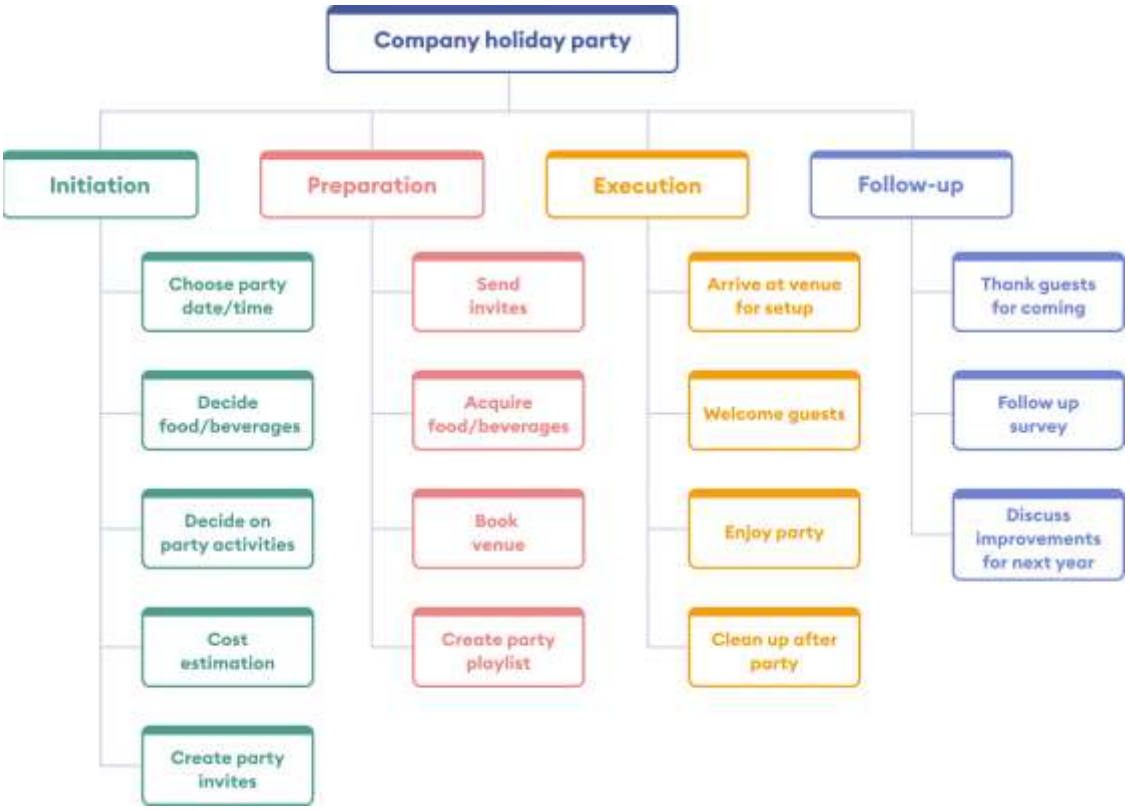

Figure 5 Work breakdown structure

- ➢ A excavation
- ➢ B concrete except
- ➢ C formatting
- ➢ D reinforcement
- ➢ E install the armature
- ➢ F concreting

Work progress chart and project schedule

Table 1 Work progress chart and project schedule

Month of operation	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Foundation																P
Skeleton execution																E
Hardening																**S**
Flooring																**K**
Electrical installations																**ME**
Mechanical																**ME**
Joinery																**N**
Tiling																**C**
Carpentry and equipment installation																**NT**
Minor work and cleaning																**JT**

What is project scheduling management?

Project scheduling is a mechanism for linking tasks and activities to be performed. It also determines the time period in which resources should be used by allocating resources.

The project schedule collects all the necessary activities in a timely manner. In fact, it can be said that project management will be easier through the schedule (17-19).

If we want to plan very well in the field of time, all the planned activities must be fully monitored and reviewed.

In the scheduling phase

- We do the project duration
- Critical path
- Critical actions
- Action step
- Bar chart
- Cost-time optimization

Critical method

The critical path method is an algorithm for scheduling a set of project activities. This algorithm is one of the most effective tools in project management (20,21). The earliest start time of each EST

operation

The earliest end time of each EFT operation The latest start time of each LSToperation The latest end time of each LFT The critical path is the path of actions for which the above values are the same (22).

Table 2Zero distance means no time should be lost

Action	EST	LST	break
A	0	0	0
B	5	7	2
C	5	6	1
D	5	5	0
E	8	11	3
F	8	10	2
G	10	11	1
H	12	12	0
I	14	14	0
J	14	18	4
K	17	17	0
L	22	22	0

Total project scope = total project actions

The critical path is the sequence of activities from the beginning to the end of a project. Although many projects have only one critical path, some projects may have more than one critical path. Delay in any of the activities in the critical path will delay the delivery of the project. In most cases, if such a delay occurs, the speed of the project must be increased so that the project is completed on time (23).

Figure 6 critical path is the sequence of activities

Bar chart based on EST

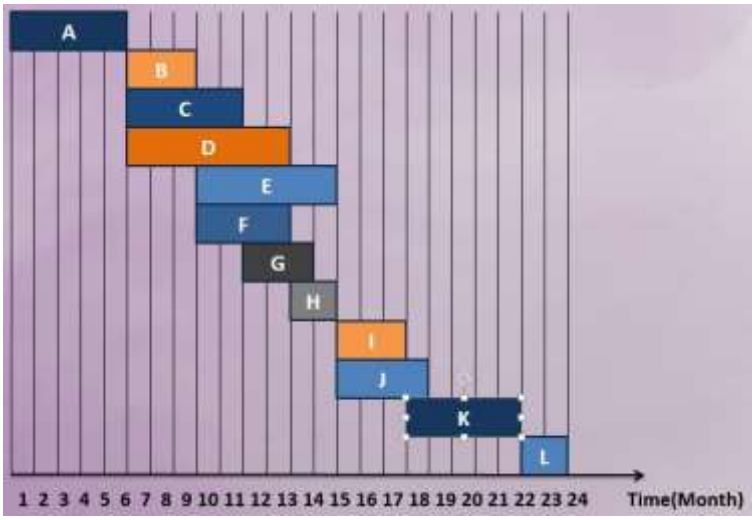

Figure 7 Bar chart based on EST

Bar chart based on LST

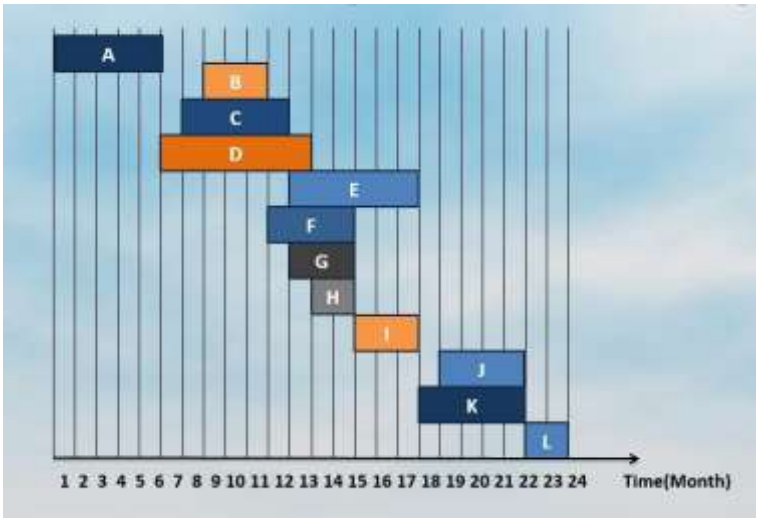

Figure 8 Bar chart based on LST

Project Control:

A project consists of several interrelated activities, and each of these activities has a set start and end date. As a result, correct project scheduling can lead to project completion on a due date. Therefore, team members have different plans that lead to project success, project start and end dates, documentation, and resource allocation. In the control phase:

- Do the actions proceed according to the schedule?

- What are the reasons for the inconsistency of operating time in the program with real time? Can they be fixed? How? Does a change in application time change the critical direction of the project?
- Does the whole project time change? How many?

Budget

The money that is allocated for an action or a project.

Cost

The way the budget is spent on the implementation of the operation or project.

Result

1. The budget is spent.

2. Costs must be planned, timed and controlled

Each project is executed with a specific purpose. So the projects are unique. In this way, the planning processes will change according to each project.

Project cost

- **Direct cost (variable cost)**
- **Indirect cost (fixed cost)**

Direct cost means the cost of project implementation

Indirect cost means the cost of office expenses, staff salaries, supervision and insurance

Determine the cost of each operation and the direct cost of the project

How much money is needed at what times? (Payment due date)

- Control the costs paid and compare the percentage of work progress
- Indirect cost of the project
- Question: How to calculate the monthly cost of the project?

Steps and processes of project time management:

Project scheduling management includes the processes required to complete a project in terms of time. The steps and processes of time management are as follows:

- Set up a monthly cost table
- Draw a cost chart
- Modify the schedule if necessary
- Time-cost optimization

Figure 9 Cost Schedule:

The need for project management is that managers and team members can use a detailed schedule to see when the product and the final result should be delivered.

Time management is a tool for managing stakeholder expectations and a basis for performance reporting. The executive team chooses a scheduling method. Then, project-specific information such as constraints, activities, scheduled dates, duration of each activity, dependencies, and resources is entered into the project management expressions, and finally, its output will be a schedule.

Cost control

- Preparation of table of essential expenses
- Preparation of results of essential expenses
- Preparation of report on the status of expenses (for example, two months)

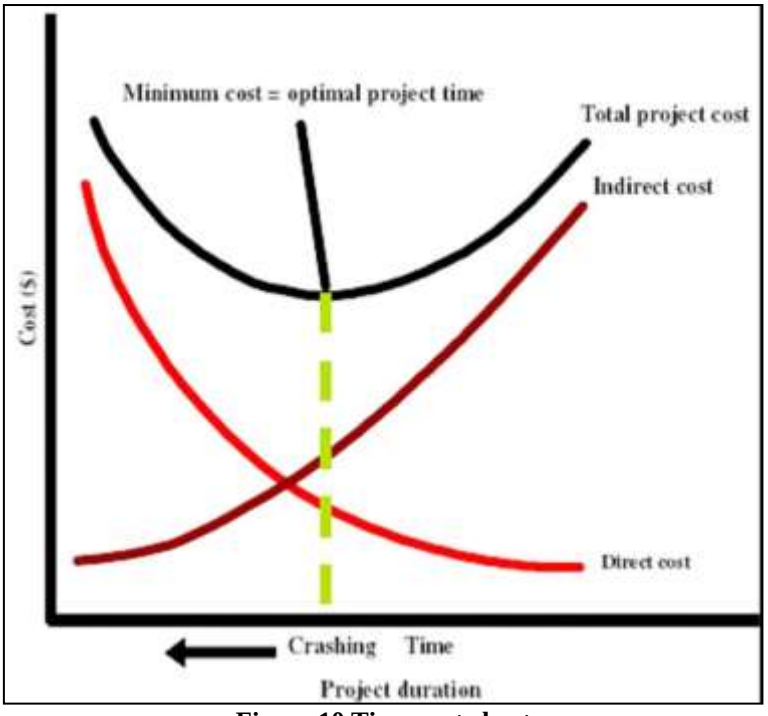

Figure 10 Time-cost chart

Conclusion

Project management has a final product and a limited time frame. For this reason, the project manager must have a wide range of different skills, including technical skills and manpower management, as well as precise mastery of his field of activity.

You need a number of parameters to develop an accurate program. The start date and delivery date of the project are very important

Finally, the status of project activities is reviewed to determine progress and adjustments based on the initial schedule. This process helps the manager identify project schedule management deviations and reduce risk.

Reference

1. Verzuh, E., & American Psychological Association. (2021). A Guide to the Project Management Body of Knowledge:PMBOK Guide.
2. Sales, L., & Barbalho, S. (2021, February). Exploitative Model for Dynamic Project Management Based on the ProjectManagement Body of Knowledge. In International Joint conference on Industrial Engineering and Operations Management (pp. 449-462). Springer, Cham.
3. Zhu, H., Hwang, B. G., Ngo, J., & Tan, J. P. S. (2022). Applications of Smart Technologies in Construction Project Management. Journal of Construction Engineering and Management, 148(4), 04022010.
4. Ghorbani, M. K., Hamidifar, H., Skoulikaris, C., & Nones, M. (2022). Concept-Based Integration of Project Management and Strategic Management of Rubber Dam Projects Using the SWOT–AHP Method. Sustainability,14(5), 2541.
5. Guo, K., & Zhang, L. (2022). Multi-objective optimization for improved project management: Current status and futuredirections. Automation in Construction, 139, 104256.
6. Gomes Silva, F. J., Kirytopoulos, K., Pinto Ferreira, L., Sá, J. C., Santos, G., & Cancela Nogueira, M. C. (2022). Thethree pillars of sustainability and agile project management: How do they influence each other. Corporate Social Responsibility and Environmental Management.
7. Qiu, Y., & Chen, H. (2022). A systematic review of the knowledge domain of institutional theory in constructionproject management. Engineering, Construction and Architectural Management.
8. Silvius, G., & Marnewick, C. (2022). Interlinking Sustainability in Organizational Strategy, Project Portfolio Management and Project Management A Conceptual Framework. Procedia Computer Science, 196, 938-947.
9. The Strategic Resources of a Gastronomy Creative City: The Case of San Antonio, Texas, M Alimohammadirokni, A Emadlou, JJ Yuan Journal of Gastronomy and Tourism 5 (4), 237-252, 2021
10. Contributions of Grand Linguistic Theories to Second Language Acquisition Research and Pedagogy, M Alimohammadirokni, International Journal of English Linguistics 5 (6), 95, 2015
11. Quantitative Modelling in Marketing and Management, M Alimohammadirokni, K Ashok, Rose Publication PTY LTD, Melbourne, Australia
12. Sabouri M, Taghibeikzadehbadr P, Shabkhiz F, Izanloo Z, Shaghaghi FA. Effect of eccentric and concentric contraction mode on myogenic regulatory factors expression in human vastus lateralis muscle. Journal of Muscle Research and Cell Motility. 2022;43(1):9-20.
13. Taghibeikzadehbadr P, Shabkhiz F, Shahrbanian S. Expression of PGC-1 alpha isoforms in response to eccentric and concentric resistance training in healthy subjects. Journal of Sport Biosciences. 2020;11(4):447-62.
14. Taghibeikzadehbadr P, Shirian S, Sabouri M. Effect of different muscle contraction mode on the expression of Myostatin, IGF-1, and PGC-1 alpha family members in human vastus lateralis muscle. Molecular Biology Reports. 2020;47(12):9251-8.
15. Abolghasem Hakimipour HB. 5- An empirical study to find important factors on building national brand: An

Iranian tourism case study. Management Science Letters. 2012;2(8):3073-80.

16. Hamed Bozorgkhou MaA. 1- Analyzing the Strategic Human resource management model by fuzzy network analysis technique (FUZZY ANP) and SWOT. 3th Executive MBA Conference2012.
17. hamed Bozorgkhou MK, Mohammadrahim Esfidani, Mohammadsaleh Torkestani. 2- Studying the role of market orientation on customer satisfaction with the TQM approach in Qazvin's Mellat branch banks. The 4th International conference on Banking Services Marketing2012.
18. Sujan MSH, Tasnim R, Islam MS, Ferdous MZ, Haghighathoseini A, Koly KN, et al. Financial hardship and mental health conditions in people with underlying health conditions during the COVID-19 pandemic in Bangladesh. Heliyon. 2022:e10499.
19. Haghighathoseini A, Bobarshad H, Saghafi F, Zare H. Extracting the Information Technology architecture of hospitals with approach of Implementing in Iran. Journal of Information and Communication Technology. 2019;8(27):37-46.
20. Haghighathoseini A, Bobarshad H, Saghafi F, Rezaei MS, Bagherzadeh N. Hospital enterprise architecture framework (study of Iranian university hospital organization). International journal of medical informatics. 2018;114:88-100.
21. Ahmadi F, Rahimi M, Rezaei A, Mehregan E. Study of Relation between Business Model and Sensemaking Decisions. Journal of Humanities Insights. 2018;2(02):205-14.
22. Elaheh Farzadnia ZH, Vipul Mandra, Ahmad Riahi, Mehregan E. Study of Hospital Quality Management and Improvement Rates in the Hospitals. Journal of Humanities Insights. 2017;1(01):07-11.
23. Water and Wastewater Industry and Energy Management, E Mehregan, A Mahmoudi, Medbiotech Journal, 4 (01), 8-12, 2020