

# A Review of Factors Affecting the Organizational Structure for Performance Improvement of Highway Construction Project

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**Abstract-** It is possible to identify organizational characteristics that affect project effectiveness. These components can be recommended for improvement in efforts to build highways. Data from highway construction organizations are acquired via a questionnaire survey to meet the study's goals. The primary elements affecting organizational performance are first noted. The criteria include size, duration, resource availability, complexity, internal and external interdependencies, customer base, uncertainty, and importance. Then, the factors that fall within these primary categories are identified. The efficacy of the organization is a result of all 10 components, some of which are essential to its operation. Because of this, this project might be helpful in enhancing the qualities of organizations that can be used in the future for significant construction projects.

## 1. INTRODUCTION

The organizational design in which a project is conducted has a significant impact on its success. Many professionals think that a major construction project's organization will have a big impact on how successfully it is completed. Understanding how organizations effect projects will help project managers increase their chances of success overall. The term "organizational structure" relates to organizational and administrative patterns, including how departments are set up, how tasks are assigned, and how authority is distributed. Thus, the timeliness (schedule) and expense of a project are greatly influenced by organizational structure.

An Organization is a group of individuals whose actions must be coordinated in order to achieve an organizational goal. The construction project's organization is temporary; because every project is different, flexibility is necessary while organizing for project management. Project scope and complexity, timeline, location, contract terms, financial arrangements, and other factors are crucial when choosing an organization. To fulfil project goals and objectives, the organizational structure must make it easier for the corporation to coordinate its activities. In the engineering and construction phases of major industrial projects, this integration and coordination are particularly crucial.

Investment in infrastructure and economic expansion are clearly related. More efficient and dependable modes of transportation are required for the movement of people and products as the economy expands more quickly. The Indian economy's rapid growth is boosting demand in the transportation sector. The transportation sector is primarily divided into the three sectors of aircraft, roadways, and railways. There are 5.23 million kilometers of roads in India. The current government's strong emphasis on infrastructure investment and welcoming attitude toward the Private-Public Partnership (PPP) model allows for private companies in the sector. India has seen 112 road projects using the public-private partnership model completed, while 150 projects are being finished.

## 2. RELATED PREVIOUS WORK

(Xueying Wu et al 2019) [1], the implementation of green projects continues to encounter several challenges with regards to the project management techniques applied in different construction projects. They find out the relationship between green construction management and the quality of highway engineering projects, and to try to help innovators identify the best place to focus.

(D. V. Parikh et al 2019)[2], He has noticed an intriguing shift in global businesses, particularly in the consulting and technology sectors, toward a performance management strategy that is more development-focused and less reliant on relative ranking and normalized. This has also prompted their Indian counterparts to analyses and improve their current performance procedures. The building business should therefore organize projects today to complete complicated jobs that cannot be done by lone persons but rather by interdisciplinary teams.

(NakHyeok Choi et al 2017) [3], According to the author of this article, the relationship between efficiency and effectiveness of highway management at the state level in the United States. It was systemically developed to assess the association by controlling for political considerations, fiscal capability, median voter, and economic situations in each state. The article investigates the empirical examination between efficiency and effectiveness, which were addressed as performance proxies in past literature. Though efficiency and effectiveness are the most significant values in the public sector, their link has not been thoroughly examined.

(David Ardit et al 2017) [4], the author explores the relationship between organizational culture and delay in a construction company. The questionnaire survey was distributed to construction businesses in the United States and India in order to obtain information on the organizational culture encountered in their projects.

(Vrushali Chaudhari et al 2015) [5], the organizational elements influencing project effectiveness can be identified. These elements might be offered for improvement in both private and public projects. The ten primary components and their sub factors are determined by a survey of the literature. Though all ten criteria are crucial for the organization's effectiveness, certain are critical to the organization's

operation. These elements will be considered in this study. As a result, this article may be useful in improving the features of organizations that can be adopted in the future for significant building projects. (Riza Yosia Sunindij 2015) [6], this study used a questionnaire survey to obtain data from construction organizations in New South Wales, Australia. The results of data analysis have identified important challenges that small firms face when implementing safety, such as connecting safety performance to insurance premiums and licensing systems, as well as financing safety training for small organizations.

(Ehab E., et al 2013) [7], in this article, the author must identify the various elements that influence organization choices. There are ten primary variables in this paper, and each element contains some sub factors, thus the overall number of factors is the questionnaire would be completed by 43 people. This study use the analytical approach to quantify the success of organizational structures and to discover the ideal organizational structure in order to analyses various organizational structures and their coordination efficiencies and provide a weight and a score to each factor.

(Lokesh Kumar Meena et al 2013) [8], to overcome the problems and capitalizing on the benefits of both line and functional organization, the current study has evolved line and staff structure. Line and staff organization is a hybrid of line and functional organization. It is a sort of organization with two sets of executives in charge of administration. The study is primarily concerned with line and staff structure in the context of organizational development.

Solomon (Kwarteng Forkuoh et al 2012) [9], in this study, the author attempts to demonstrate the relationship and correlation between the traditional family setup, line of authority, and chain of command. Finally, he compares family businesses to non-family firms and recommends the best practices for the seamless operation and management of family enterprises. A research on the chain of command in families, family businesses and non-family businesses, as well as business organizational charts, was conducted and the final recommendation was submitted to the authorities.

(Meera Ramesh Kumar Patel et al 2017) [10], the author of this document demonstrates various types of MCDM (Multi- Criteria Decision Making) strategies as well as information about the SMART method. This

paper discusses the SMART method's application and procedure. The author utilizes the case study to calculate weightage and scores using the SMART approach.

(Ahmed Ebrahim Abu El-Maaty et al 2016) [11], the primary goal of this article is to improve the management of highway projects in Egypt by identifying the most critical aspects influencing the industry's quality performance. A thorough literature study identified 39 characteristics that may influence the quality of highway improvements. The elements are tabulated in a questionnaire, which is distributed to 13 divided highway owners, 27 regional road owners, and 15 consultants.

(R A. Rahman et al 2020) [12], the purpose of this study is to identify elements that, in the views of industry professionals, are having an impact on highway projects in Malaysia. Analysis of interview data with highway project managers is done to reach this goal. There are eleven aspects that Malaysian highway projects need to consider in order to succeed. The alternative elements that are influencing the success of highway projects are presented to scholars and practitioners in this study, adding to the body of knowledge in the field. The industry would benefit from this study's lessons in promoting the success of highway projects in Malaysia.

### 3. EXISTING APPROACHES FOR PREDICTING TECHNIQUES

[1] The Adopted mixed research method where both quantitative and qualitative research approaches. [2] Focuses on Improvement the performance management skills of an individual and teams. [3] To build up the concept of efficiency and effectiveness for infrastructure spending, to suggest measurement strategies, and to find empirical evidence on their relationship. [4] Author investigates that explore the relationship between a construction company's organizational culture and delay. [5] Considers the ten factors which are responsible for the effectiveness of organization. [6] Mainly focus on improvement efforts on safety performance of small organizations. [7] Identify the different factors those are affecting organization selection. [8] The work is mainly concern with line and staff organization in organization development. [9] The relationship and correlation among the family set up, line of authority and chain of

command in traditional family set up. [10] Takes the case study and uses the SMART method to calculate the weightage and scores. [11] To improve the management of highway projects in Egypt by identifying the most critical aspects influencing the industry's quality performance. [12] To identify elements that, in the views of industry professionals, are having an impact on highway projects in Malaysia, Analysis of interview data with highway project managers is done to reach this goal and there are eleven aspects that Malaysian highway projects need to consider in order to succeed.

### 4. THE CONCEPT OF ORGANIZATION

The concept of organizational structure permeates both organizational theory and research. Numerous theoretical works make an effort to explain how organizations are structured in terms of size, technology, and how certain or uncertain the environment is. In order to verify and improve structural hypotheses, modern research studies comparing organizations have similarly examined data indicating organizational attributes rather than traits of specific individuals. Surprisingly, neither these theoretical advancements nor research studies comparing organizations have explored the implications of defining certain relational properties of organizations—like hierarchy levels, spans of control, and the like—as structure, as well as more general characteristics like their rules and decision-making procedures.

Departmentalization, delegation, the scalar principle of chain-of-command, centralization, decentralization, and the contingency approach are all concepts related to organizational structure and performance. In order to increase operational efficiency, related functions are grouped together into departments. Line structures, line and staff structures, and matrix structures are all examples of departmentalization. The matrix structure can include an employee working on projects managed by people not from his or her own department.

#### 4.1 Organizational Structure

The typically hierarchical arrangement of lines of authority, communications, rights and duties of an organization. Organizational structure determines how the role, power and responsibilities are assigned, controlled and coordinated and how information flows between the different levels of management. A

structure depends on the organization's objectives and strategy. In a centralized structure, the top layer of management has the greatest number of decision-making power and has tight control over departments and divisions. In a decentralized structure, the decision-making power is distributed, and departments and divisions may have different degrees of independence.

#### 4.2 Types of Organizational Structures:

The types of organizational structure are: - 1) line organization 2) line and staff organization 3) functional organization 4) matrix organization.

##### 1. Line organization structure:

A line organization has is the simplest and oldest form of organizational structure. The line of authority flows vertically from top most executive to the lower most subordinate throughout the organization. Where, the manager has direct authority over their respective subordinates throughout the chain of command. Authority flows directly from top to bottom through various manager positions; it is simple form of organization. The Line authority is referring to the direct authority of a manager over his subordinates.

##### 2. Line and Staff Organization

In this type of organization structure two type of authority relationship is staff and line authority. The Staff authorities means authority to advice, support and serve the line managers. All type managerial functions are practiced by line authority with the help of specialized skill of staff authority. It is modified by line organization and is more complex than it. Staff managers and line managers are Prestigious on the basis of their role. There is more specialization and division of work. And Conflict may arise between line and staff authority. This type of organization come in to existence because line authority cannot assumed direct responsibility for all function such as research, design, planning, scheduling and recording a performance.

##### 3. Functional organization:

The basis of function organization is specialization. In such a organization each function is carried out by a specialist. The idea behind this type of organization is to divide the work in such a way that each person has to perform minimum number of function and its fully responsible for that function. All similar and related

work is group together under one person and in order to perform his function effectively the person has to report to several superior thus a subordinate will be commanded directly by number of superior each with authority in his old field.

##### 4. Matrix Organization Structure:

The Most design-construct organizations and a number of public owners have developed the some form of matrix Organization. A strong Matrix Organization assigns maximum power to the project managers, a weak matrix assign maximum powers to functional manager; while a balanced matrix divides the power in to functional & project responsibilities. The matrix organization endower to solve the conflicts between the operating line organization as represented by the project manager and the functional staff by opening up lines of communications at all levels and through assigning subordinate managers duel reporting responsibility. Project responsibility such as scope, cost& schedule are the responsibility of project manager. Functional objectives such as quality assurance, design standards & internal company policies are the responsibility of the functional staff.

#### 4.3 Principles of Organization:

In order to be effective an organization has to follow certain basic principles as given below;

##### Principle of objective

The objective of organization should be clearly defined

##### 1. The scalar principle

The line of authority should be clearly defined from chief executive at top, to the supervisor at bottom; this is known as scalar principle. The importance of this principle is that, the understanding authority relationships within the organization become easier.

##### 2. Principle of balance between authority and responsibility

In order to perform the task properly it is necessary that everyone knows his/her responsibility and authority. The person who is assign responsibility to do a certain job must be given appropriate authority to achieve the same.

##### 3. Principle of unity of command

The principle that each subordinate should report to only one superior is called unity of command. This not only avoids confusions but also help in maintaining definite line of command.

##### 4. Principle of span of control

According to this principle there is a limit to the number of subordinates, so that an executive can effectively supervise. It depends on type of work, levels of organizations, abilities of persons involved. The optimum span of control varies from job to job. Generally number 6 is taken as an effective span of control.

5. Principle of departmentation

It is division of organization into distinct departments. It increases the efficiency of organization.

6. Principle of specialization

According to this principle activities of organization should be grouped as per the functions and assigned to individuals according to their specialization.

7. Principle of communication

The number of supervisory levels in organization should be kept as small as possible; this shortens the line of communication.

8. Principle of flexibility and stability

On one hand organization should be flexible to accept the changes, which is necessary because of internal and external situation. On the other hand, the organization must be stable enough to withstand any organizational change which is necessary to accomplish its objectives.

9. Principle of motivational and professional growth

Organizational structure should be such that it provides enough opportunities to its personnel for their professional growth and upward and lateral mobility each member of organization must be motivated towards loyalty for the organization.

10. Principle of continuity

The organizational structure should be dynamic so that it not only provides the activities necessary to achieve its objective but also for continuation of such activities in future.

5. DISCUSSION RELATED TO PROPOSED WORK

1. A literature review of prior research studies from various national and international journal research publications is to be conducted. Understanding basic terms and conducting additional research will be aided by this.
2. To carry out the suggested analysis of various organizational forms applied to road construction projects.

3. Conducting case studies on the six to eight highway construction projects that are now underway in Maharashtra.
4. Creation of the questionnaire for the aforementioned study by determining the organizational aspects influencing the project's effectiveness.
5. Conduct personal interviews with employees to gather data, and have them complete a questionnaire.
6. To use the SMART (Simple Multi Attribute Rating Technique) or RI approach to analyse the aforementioned data. Using this procedure, each important factor is ranked, the results are scored, and the weighting of each factor is determined.
7. The primary factors impacting each organization will be taken into consideration when creating the graphics.
8. Based on the aforementioned research, conclusions will be drawn and relevant organizational structure recommendations will be made.

6. CONCLUSION

1. The study identifies the key elements in the optimization of the organizational structure that are relevant to the highway construction industry and that will enhance the efficiency of the construction organization in those firms.
2. According to the study's findings, there are many crucial elements for various organizational structures for highway construction firms that are likely to enhance efficient operations and contribute to project success.
3. The study's factors can be used as a check list to create an organizational structure for the highway organization. The critical factors stated in the study for a specific organization can be used as the most important factors by the manager level person who will establish an organizational structure for the project.
4. As an active resource, the project manager must be an effective and visible leader. A good project manager is self-motivated and goal-oriented. This is especially important in the organization of highway construction.
5. When it comes to employee arrival and departure times, organizations keep a strict level of

discipline. This results in the project manager receiving daily reports on the work, which helps to keep the project on time. As a result, the project's duration is reduced.

6. Over the past few decades, technology has had a significant impact on the development and building industries. Effects can be seen in a variety of fields, including organizational effectiveness, communication style, and employee conduct.
7. It goes without saying that technology aids in reducing effort and speeding up work, so the members of the organizational structure must be technocrats in order to create a strong and effective company. Thus, it plays a crucial role in the planning of highway development.

### 7. FUTURE WORK

This research will concentrate on studying the organizational structure of the different construction projects. The report from the investigations of case studies of highway construction projects aims further to improve the characteristics of organizations, which can be implemented in the future major construction. In addition, comparison can be done between organizations of highway construction projects.

### REFERENCE

1. Xueying Wu, Wenyi Zhao and Tianshan Ma, "Improving the Impact of Green Construction Management on the Quality of Highway Engineering Projects," *Sustainability* 2019, 11, 1895; doi: 10.3390/su11071895, journal MDPI, Published: 29 March 2019.
2. Dhaval Virendra Parikh, Prof. Sumit Phugat, "Performance Management in Road Construction Project," *International Research Journal of Engineering and Technology*, Volume 06, Issue 04, Apr 2019 (1561-1566).
3. NakHyeok Choi and Kyujin Jung, "Measuring Efficiency and Effectiveness of Highway Management in Sustainability," *Sustainability* 2017, 9, 1347; doi: 10.3390/su9081347.
4. David Ardit, Shruti Nayak, Atilla Damci "Effect of organizational culture on delay in construction", *International Journal of Project Management* 35 (2017) 136 – 147.
5. Vrushali Chaudhari, Prof. P. B. Bhangale, "Effective Organizational Structure for Construction Industry: Case Study," Volume IV, Issue VII, July 2015.
6. Riza Yosia Sunindij, "Improving safety among small organizations in the construction industry: key barriers and improvement strategies," *Proceeding Engineering* 125 (2015) 109 – 116.
7. Ehab E., Hossam H., Waleed M., "Optimum Organization Structure for construction projects (Management tool of selecting Organization in Egyptian Construction Market)", *International journal of Engineering Science and Innovative Technology (IJESIT)* Vol.2, Issue 3, May 2013, pp.411-431.
8. Lokesh Kumar Meena S. L. Bairwa K. Lakra, Maina Kumari and R. S. Meena, "A Study of Line and Staff Organization in Organization Behavior, research gate, publication No- 303251506, July 2013.
9. Solomon Kwarteng Forkuoh, Abraham Osei, "Adopting best organizational structure for effective Management and control of family businesses in Ghana," *International Journal of Advanced Research in Management and Social Sciences*, ISSN: 2278-6236 Vol. 1 | No. 3 | September 2012.
10. Mulla Aneesa.I, Dr. A.K.Gupta, Prof. D.B.Desai, "Supply Chain Management: Effective Tool in Construction Industry," *International Journal of Novel Research in Engineering and Science*, Vol. 2, Issue 1, pp.: (35-40), Month: March 2015.
11. Ahmed Ebrahim Abu El-Maaty, Ahmed Yousry Akal, and Saad El-Hamrawy, "Management of Highway Projects in Egypt through Identifying Factors Influencing Quality Performance", *Hindawi Publishing Corporation Journal of Construction Engineering ;Volume 2016; Article ID 4823630*, 8 pages.
12. R A. Rahman, A R Radzi, M S H Saad and S I Doh, "Factors affecting the success of highway construction projects: the case of Malaysia", *IOP Conf. Series: Materials Science and Engineering* 712 (2020) 012030 doi:10.1088/1757-899X/712/1/012030.