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# Addressing Construction Delays in Construction Projects in Gwalior

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***Abstract:*** ***Construction enterprise is one of the sizable members to the economic boom and improvement of cambodia. Two predominant demanding situations are proscribing the performance of the construction industry in india, which might be terrible cost and schedule overall performance of the development initiatives. Consequently, the purpose of this study is to fill an essential knowledge gap with the aid of identifying the diverse attributes for production undertaking put off, the usage of the residential constructing tasks as a start line. Comments from a survey administered to the contractors and consultants. The purpose of the research take a look at is to develop a postpone evaluation gadget for assessing and lowering the impact of put off in indian production projects. The technique used number one and secondary facts. Number one data had been obtained the usage of exceptional participatory research approaches (pra) which include, in-depth interview, consciousness institution discussions and questionnaires. The outcomes found out the elements that contributed to the causes of delays in building production task***

***Keywords: Delay, Causes of delay, Effect of delay, Relative important index, Chi- test Statistics.***

## I. INTRODUCTION

Numerous factors can contribute to delays on a undertaking and studying the reasons of delays is an critical task for ameliorating any capacity conflicts or claims (schumacher 2007). According assaf and hazni, (2006), production delays play a key role in any mission success. The delay elements are very crucial inside a creation venture and it's important that each one stakeholders have to have positive expertise regarding this issue so as for the venture to be completed efficiently and satisfactorily. Most delays in constructing construction tasks are complicated and plenty of researchers emphasizes at the high fee and the associated threat associated with litigating tactics braimah, 2008 ; long, 2004). The building creation industry in nigeria has grown significantly over the past years. Lack of understanding throughout the development industry is one of the important thing issues in the enterprise (magid, 2006). There is robust evidence of inconsistent performance of nigeria production projects each by international corporations and local construction contractors (lcc) and the fashion is growing swiftly (naha, 2008).Building tasks are reportedly failing across all of the key performance in nigerian production industries. In line with theodore et al, 2009), the dramatic shift in the capability and extent of the nigerian creation region over the last decade warrants a scientific analysis of the delays. Mansfield (2013), located that well timed finishing of production undertaking become a signal of undertaking efficiency. However, construction approaches depend upon numerous variables and unpredictable elements that arise from diverse assets, together with performance of involved party, availability of sources, website online conditions and contractual situations. It's miles therefore vital to ascertain the important thing factors impacting delays in the constructing construction enterprise and establishes the connection between the critical attributes for assessing the impact of those factors. There may be limited look at concerning the intrinsic factors affecting on delays in building construction venture in India. Therefore, the look at is essential in an try to verify the factors affecting delays on constructing creation tasks in phrases of well timed transport.

## II. OBJECTIVES

The main objectives of this study include the following:

*A.* To identify the causes of delays in construction projects.
*B.* To identify the approaches for solving the problems regarding delay.
*C.* To minimize the effect of delay in construction project.
*D.* To test the importance of the causes of delay between two groups.

## III. METHODOLOGY

A questionnaire survey was conducted of construction professionals representing various stakeholders involved in construction projects in India

### *A. Questionnaire Design*

The questionnaire was designed based on critical factors were identified that contributed to the causes of delays. A questionnaire survey was developed to assess the perceptions of various construction professional of the relative importance of causes and the effects of construction delays. The questionnaire was designed into two sections: Section A; section B. Section A is to obtain the requested background information about the respondents. Section B is to obtain the information on factors that contribute to the causes of delays in construction projects from the perspective of construction professionals. A total twenty eight resource related factors were identified under three broad categories namely manpower related, material related and equipment related issues. Thecritical factors are listed in Table 1. A five point Likert scale (1 very low, 2 low, 3 moderate, 4 high, 5 very high) was adopted where respondents were asked to rank the importance and impact of a particular factors on delay in one of their selected projects.Descriptive statistics techniques namely Relative Importance Index (RII) has been used to highlight the relative importance of critical factors as perceived by the respondents (Assaf et. al, 1995; Faridi and El-Sayegh, 2006; Iyer and Jha, 2005; kmaraswamy and Chan, 1998).

### *B. Analysis of Data*

The data obtained was analyses to determine the relative importance of the various factors that contribute to causes of construction delays. The method for data analysis consist of 2 steps:

### *C. Relative Importance Index (RII)*

Assess the relative significance among risks, previous literatures work study suggests establishing a risk significance index by calculating a significance score for each risk. For Calculating the significance score, multiply the probability of occurrence by the degree of Impact. The significance score for each risk assessed by each respondent can be obtained through the model

$$S^i_j = A^i_j * B^i_j$$

Where $S^i_j$ = Significance score assessed by respondent j for risk i

$A^i_j$ = Occurrence of risk i, assessed by respondent j

$B^i_j$ = degree of impact of risk I, assessed by respondent j.

By averaging scores from every one of the reactions, it is conceivable to get a normal importance score for each hazard, and this normal score is known as the hazard record score and is utilized for positioning the dangers. The model for the figuring of hazard list score can be characterized as

$$R_s^i = \sum_j^T = 1 \; S^i_j / T$$

Where $R_s^i$ = index score for risk i

$S^i_j$ = Significance score assessed by respondent j for risk i

T= total number of responses

Applicability of Test Results to Construction Industry -

### *D. Hypothesis Analysis*

To test for hypothesis chi- test statistics was used to determine the significance of the level of importance attached to factors causing delays in building construction project (Odeh and Battaineh, 2005).

$$X^2_C = \sum ( O_{i-Ei} )^2 / Ei$$

Where:

*1)* The subscript “c” are the degrees of freedom.
*2)* O is the observed value(s).
*3)* E is the expected value(s).
*4)* $X^2$ chi –test statistcs

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## IV. RESULT AND DISCUSSIION

| NTERVIEW NO. | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | Total | Mean(m) | SD(s) | C.O.V=(s/m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S.NO | CATEGOREY | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Delay in progress payments to contractors /consultant | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 8.8 | 0.419 | 0 | 0 |
| 2 | Conflicts between joint-ownership | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 0.6 | 0.6 | 0.4 | 0.4 | 0.6 | 0.6 | 0.6 | 0.4 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.6 | 0.4 | 10.2 | 0.485 | 0 | 0 |
| 3 | Slow decision-making by owners | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 0.6 | 0.4 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 0.4 | 0.6 | 0.6 | 0.4 | 0.6 | 9.8 | 0.466 | 0.1 | 0.214285714 |
| 4 | Unrealistic imposed contract duration | 0.6 | 0.4 | 0.6 | 0.6 | 0.4 | 0.6 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.6 | 0.4 | 0.6 | 0.4 | 0.6 | 0.4 | 0.4 | 0.6 | .4.4 | 10 | 0.476 | 0 | 0 |
| 5 | Technology changes & modification from client | 0.4 | 0.4 | 0.4 | 0.6 | 0.6 | 0.6 | 0.4 | 0.6 | 0.6 | 0.6 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.6 | 0.6 | | 0.6 | 14.2 | 0.676 | 0.1 | 0.147887324 |
| 6 | Routine of government authorities and approvals | 0.6 | 0.6 | 0.8 | 0.4 | 0.6 | 0.8 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.6 | 0.4 | 0.4 | 0.6 | 0.6 | 0.4 | 0.6 | 0.6 | 0.2 | 10.8 | 0.514 | 0.2 | 0.388888889 |
| 7 | Duration is not enough for constructing the project | 0.6 | 0.4 | 0.6 | 0.6 | 0.6 | 0.6 | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 0.6 | 0.6 | 0.4 | 0.6 | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 0.4 | 10.4 | 0.495 | 0.1 | 0.201923077 |
| 8 | Change orders by client during construction | 0.4 | 0.4 | 0.6 | 0.8 | 0.4 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 10.4 | 0.495 | 0.1 | 0.201923077 |
| 9 | Delay in approving shop drawing and sample material by client | 0.6 | 0.6 | 0.4 | 0.6 | 0.6 | 0.6 | 0.4 | 0.6 | 0.4 | 0.4 | 0.6 | 0.6 | 0.4 | 0.6 | 0.6 | 0.4 | 0.6 | 0.6 | 0.6 | 0.4 | 0.6 | 11.2 | 0.533 | 0 | 0 |
| 10 | Difficulties in financing the project by contractor | 0.4 | 0.6 | 0.4 | 0.6 | 0.4 | 0.4 | 0.6 | 0.6 | 0.4 | 0.6 | 0.8 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.6 | 0.6 | 10.4 | 0.495 | 0.1 | 0.201923077 |
| 11 | Rework due to workers mistakes | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.6 | 0.6 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 9.6 | 0.457 | 0 | 0 |
| 12 | Construction Methods | 0.4 | 0.4 | 0.8 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.6 | 0.4 | 0.4 | 0.6 | 0.6 | 0.4 | 0.4 | 0.4 | 9.6 | 0.457 | 0 | 0 |
| 13 | Poor communication and coordination of labor | 0.6 | 0.8 | 0.8 | 0.8 | 0.6 | 0.8 | 0.6 | 0.4 | 0.6 | 0.4 | 0.6 | 0.6 | 0.4 | 0.4 | 0.4 | 0.6 | 0.6 | 0.4 | 0.8 | 0.6 | 0.4 | 12.2 | 0.580 | 0.1 | 0.172131148 |
| 14 | Administration problem during work | 0.6 | 0.8 | 0.6 | 0.8 | 0.4 | 0.6 | 0.6 | 0.6 | 0.4 | 0.6 | 0.6 | 0.6 | 0.6 | 0.4 | 0.6 | 0.6 | 0.4 | 0.4 | 0.8 | 0.6 | 0.6 | 12.2 | 0.580 | 0 | 0 |
| 15 | Inadequate Contractor Experience | 0.4 | 0.6 | 0.4 | 0.6 | 0.6 | 0.8 | 0.6 | 0.4 | 0.6 | 0.8 | 0.4 | 0.4 | 0.4 | 0.6 | 0.6 | 0.4 | 0.6 | 0.4 | 0.8 | 0.4 | 0.6 | 11.4 | 0.542 | 0.1 | 0.184210526 |
| 16 | Construction planning errors & | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.8 | 0.6 | 0.6 | 0.4 | 0.6 | 0.6 | 0.6 | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 0.6 | 0.6 | 0.4 | 0.8 | 11 | 0.523 | 0.1 | 0.190909091 |

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | equipment failure | | | | | | | | | | | | | | | | | | | | | | | | |
| **17** | Mistakes and discrepancies in contract documents | 0.4 | 0.4 | 0.4 | 0.6 | 0.6 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.6 | 0.8 | 0.4 | 0.8 | 10.4 | 0.495 | 0.2 | 0.403846154 |
| **18** | Price level changes of material in market | 0.4 | 0.2 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.2 | 0.4 | 0.6 | 0.4 | 0.2 | 0.2 | 0.4 | 0.4 | 0.4 | 0.4 | 7.8 | 0.371 | 0 | 0 |
| **19** | Lack of labour | 0.4 | 0.2 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 0.4 | 0.2 | 0.2 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.6 | 0.4 | 0.4 | 8.4 | 0.4 | 0 | 0 |
| **20** | Contract Management | 0.2 | 0.4 | 0.4 | 0.2 | 0.4 | 0.4 | 0.4 | 0.2 | 0.4 | 0.4 | 0.4 | 0.4 | 0.2 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 7.8 | 0.371 | 0.1 | 0.269230769 |
| **21** | Preparation and approval of drawing | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.6 | 0.4 | 0.4 | 0.2 | 0.4 | 0.6 | 0.6 | 0.4 | 0.8 | 0.4 | 0.6 | 9.6 | 0.457 | 0.1 | 0.21875 |
| **22** | Quality assurance/ control | 0.2 | 0.4 | 0.6 | 0.4 | 0.6 | 0.6 | 0.4 | 0.4 | 0.6 | 0.6 | 0.6 | 0.6 | 0.2 | 0.2 | 0.6 | 0.6 | 0.4 | 0.4 | 0.6 | 0.4 | 0.6 | 10 | 0.476 | 0.2 | 0.42 |
| **23** | Delay in performing inspection and testing | 0.6 | 0.6 | 0.4 | 0.6 | 0.4 | 0.4 | 0.6 | 0.2 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.2 | 0.4 | 0.4 | 0.4 | 0.6 | 0.8 | 0.6 | 0.4 | 9.8 | 0.466 | 0.1 | 0.214 |
| **24** | Mistake in design documents | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 0.4 | 0.6 | 0.6 | 0.6 | 0.6 | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 0.6 | 0.6 | 0.6 | 10.4 | 0.495 | 0.1 | 0.201 |
| **25** | Lake of interest in the project | 0.4 | 0.6 | 0.6 | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 0.6 | 0.4 | 0.6 | 0.6 | 0.2 | 0.2 | 0.6 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.6 | 9.8 | 0.466 | 0.1 | 0.214 |
| **26** | delay of payment from client | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.6 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.8 | 0.4 | 0.6 | 10 | 0.476 | 0.1 | 0.21 |
| **27** | Lack of consultant experience in construction projects | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.6 | 0.6 | 0.4 | 0.4 | 0.6 | 0.6 | 0.6 | 0.4 | 0.6 | 0.4 | 0.4 | 0.6 | 0.8 | 0.6 | 0.8 | 11 | 0.523 | 0.2 | 0.381 |
| **28** | Delay in the approval of contractor submission by the engineer | 0.6 | 0.8 | 0.4 | 0.6 | 0.6 | 0.6 | 0.4 | 0.6 | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.6 | 0.6 | 0.8 | 0.6 | 0.6 | 11.4 | 0.542 | 0 | 0 |
| **29** | Quality of Material | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.8 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.2 | 0.4 | 8.6 | 0.409 | 0 | 0 |
| **30** | Shortage and Material | 0.4 | 0.6 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.8 | 0.4 | 0.6 | 0.4 | 0.4 | 0.2 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.2 | 0.4 | 9 | 0.428 | 0 | 0 |
| **31** | Materials Price Fluctuations | 0.8 | 0.8 | 0.6 | 0.8 | 0.8 | 0.8 | 0.8 | 0.6 | 0.6 | 0.8 | 0.4 | 0.6 | 0.6 | 0.2 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.4 | 0.8 | 13.4 | 0.638 | 0 | 0 |
| **32** | Late procurement of materials | 0.8 | 0.8 | 0.4 | 0.8 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.4 | 0.6 | 0.4 | 0.6 | 0.6 | 0.6 | 0.6 | 0.8 | 0.2 | 0.6 | 12.4 | 0.590 | 0.1 | 0.169 |
| **33** | Changes in materials types during construction | 0.8 | 0.6 | 0.4 | 0.8 | 0.6 | 0.6 | 0.6 | 0.6 | 0.4 | 0.6 | 0.4 | 0.6 | 0.6 | 0.4 | 0.6 | 0.6 | 0.4 | 0.6 | 0.6 | 0.4 | 0.4 | 11.6 | 0.552 | 0.2 | 0.362 |
| **34** | Sudden increase in quantity needed | 0.6 | 0.4 | 0.4 | 0.6 | 0.8 | 0.6 | 0.8 | 0.4 | 0.4 | 0.6 | 0.6 | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.6 | 10.8 | 0.514 | 0 | 0 |
| **35** | Delay in Materials Delivery | 0.4 | 0.4 | 0.6 | 0.4 | 0.6 | 0.6 | 0.6 | 0.4 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.2 | 0.4 | 9.2 | 0.438 | 0 | 0 |
| **36** | Shortage of Labour Supply | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.6 | 0.4 | 0.6 | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 0.6 | 0.4 | 4 | 0.4 | 0.6 | 0.2 | 0.2 | 12.8 | 0.609 | 0.1 | 0.164 |
| **37** | Labour Productivity | 0.8 | 0.8 | 0.6 | 0.6 | 0.8 | 0.6 | 0.4 | 0.6 | 0.8 | 0.6 | 0.6 | 0.4 | 0.6 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.8 | 0.4 | 0.6 | 12.2 | 0.580 | 0.1 | 0.172 |

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **38** | Equipment Availability and Failure | 0.6 | 0.6 | 0.6 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.6 | 0.6 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.6 | 0.6 | 0.6 | 0.2 | 0.4 | 10.4 | 0.495 | 0.1 | 0.201 |
| **39** | Personalconflicts among labours | 0.8 | 0.8 | 0.6 | 0.6 | 0.6 | 0.6 | 0.4 | 0.4 | 0.4 | 0.8 | 0.4 | 0.6 | 0.4 | 0.4 | 0.6 | 0.6 | 0.6 | 0.6 | 0.8 | 0.4 | 0.4 | 11.8 | 0.561 | 0.2 | 0.355 |
| **40** | Labour exodus /evacuated from the region | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.4 | 0.6 | 0.6 | 0.4 | 0.6 | 0.4 | 0.6 | 0.6 | 0.4 | 0.4 | 10.6 | 0.504 | 0.1 | 0.198 |
| **41** | Nationality and language of labours | 0.6 | 0.6 | 0.6 | 0.4 | 0.4 | 0.6 | 0.6 | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.6 | 0.2 | 0.2 | 9.6 | 0.457 | 0.2 | 0.4375 |
| **42** | Low skilled/productivity level or unqualified labours | 0.8 | 0.6 | 0.4 | 0.6 | 0.6 | 0.4 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.4 | 0.6 | 0.4 | 0.6 | 0.4 | 0.4 | 0.6 | 0.8 | 0.6 | 0.6 | 11.8 | 0.561 | 0.1 | 0.177 |
| **43** | Presence of Unskilled Labor | 0.6 | 0.8 | 0.4 | 0.8 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.8 | 0.6 | 0.4 | 10.6 | 0.504 | 0.1 | 0.198 |
| **44** | Change Order | 0.4 | 0.4 | 0.2 | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 8.8 | 0.419 | 0 | 0 |
| **45** | Mistake and Discrepancies in Contract Documents | 0.4 | 0.4 | 0.4 | 0.6 | 0.6 | 0.6 | 0.6 | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.6 | 0.8 | 0.4 | 10.2 | 0.485 | 0 | 0 |
| **46** | Difficulties in financing the project by contractor | 0.2 | 0.4 | 0.2 | 0.4 | 0.4 | 0.2 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.2 | 0.4 | 0.4 | 0.4 | 0.4 | 0.2 | 7.6 | 0.361 | 0 | 0 |
| **47** | Major Dispute and Negotiations | 0.2 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 8.6 | 0.409 | 0.1 | 0.244 |
| **48** | Inappropriate Overalll Organization Structure Linking all Parties to the Project | 0.4 | 0.4 | 0.4 | 0.6 | 0.6 | 0.4 | 0.8 | 0.6 | 0.6 | 0.6 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 10.2 | 0.485 | 0 | 0 |
| **49** | Lack of Communication Between the Parties | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.8 | 0.6 | 0.8 | 0.4 | 0.4 | 0.6 | 0.6 | 0.6 | 0.6 | 0.4 | 0.6 | 0.4 | 0.6 | 0.6 | 0.4 | 12 | 0.571 | 0.1 | 0.175 |
| **50** | Lack of Contractor Administrative Personnel | 0.6 | 0.6 | 0.6 | 0.6 | 0.8 | 0.6 | 1 | 0.6 | 0.6 | 0.4 | 0.4 | 0.6 | 0.6 | 0.6 | 0.6 | 0.2 | 0.6 | 0.4 | 0.6 | 0.6 | 0.6 | 12.2 | 0.580 | 0 | 0 |
| **51** | Delay in mobilization | 0.2 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.6 | 0.4 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.6 | 0.6 | 0.8 | 9.8 | 0.466 | 0.3 | 0.642 |
| **52** | Severe Weather Condition | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.2 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 8.4 | 0.4 | 0 | 0 |
| **53** | Regulatory Changes and Building Code | 0.8 | 0.6 | 0.6 | 0.6 | 0.8 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.4 | 0.6 | 0.4 | 0.6 | 0.6 | 12.6 | 0.6 | 0.1 | 0.166 |
| **54** | Problems with Neighbors | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.6 | 0.4 | 0.4 | 8.8 | 0.419 | 0 | 0 |
| **55** | Unforeseen Ground Condition | 0.6 | 0.4 | 0.4 | 0.4 | 0.6 | 0.6 | 0.6 | 0.4 | 0.4 | 0.4 | 0.6 | 0.2 | 0.4 | 0.4 | 0.6 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 9.8 | 0.466 | 0 | 0 |
| **56** | Legal Dispute Between Project | 0.6 | 0.6 | 0.6 | 0.6 | 0.8 | 0.4 | 0.8 | 0.6 | 0.6 | 0.6 | 0.8 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.4 | 0.6 | 0.6 | 0.6 | 12.8 | 0.609 | 0 | 0 |

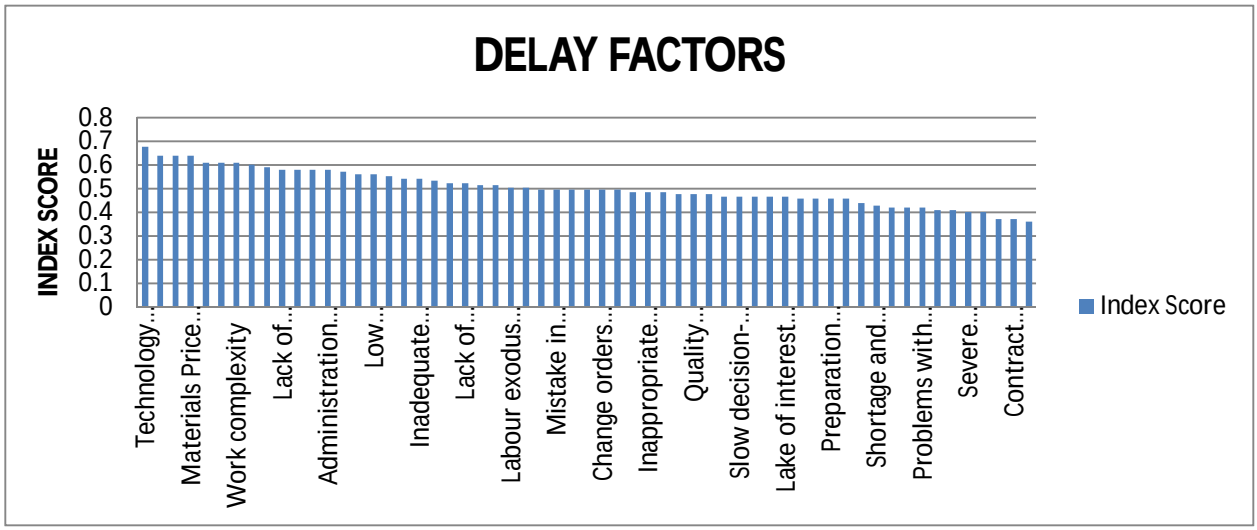
| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | participants | | | | | | | | | | | | | | | | | | | | | | | | |
| **57** | Work complexity | 0.8 | 0.6 | 0.6 | 0.8 | 0.8 | 0.6 | 0.8 | 0.6 | 0.8 | 0.8 | 0.6 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 0.6 | 0.4 | 0.6 | 0.8 | 12.8 | 0.609 | 0 | 0 |
| **58** | Economic crisis | 0.8 | 0.6 | 0.6 | 0.8 | 0.8 | 0.6 | 0.8 | 0.6 | 0.8 | 0.8 | 0.6 | 0.6 | 0.6 | 0.6 | 0.8 | 0.4 | 0.6 | 0.4 | 0.4 | 0.8 | 0.4 | 13.4 | 0.638 | 0.2 | 0.313 |
| **59** | Change in government regulations and laws | 0.6 | 0.6 | 0.6 | 0.8 | 0.8 | 0.6 | 0.8 | 0.6 | 0.8 | 0.8 | 0.8 | 0.4 | 0.4 | 0.4 | 0.8 | 0.6 | 0.6 | 0.4 | 0.6 | 0.8 | 0.6 | 13.4 | 0.638 | 0 | 0 |

Table 4.1 Results

Table 4.2 Ranking of Delay Factors

| Factors | Index Score | Rank order |
|---|---|---|
| Technology changes & modification from client | 0.676 | 1 |
| Economic crisis | 0.638 | 2 |
| Change in government regulations and laws | 0.638 | 2 |
| Materials Price Fluctuations | 0.638 | 2 |
| Shortage of Labour Supply | 0.609 | 3 |
| Legal Dispute Between Project participants | 0.609 | 3 |
| Work complexity | 0.609 | 3 |
| Regulatory Changes and Building Code | 0.6 | 4 |
| Late procurement of materials | 0.59 | 5 |
| Lack of Contractor Administrative Personnel | 0.58 | 6 |
| Labour Productivity | 0.58 | 6 |
| Poor communication and coordination of labor | 0.58 | 6 |
| Administration problem during work | 0.58 | 6 |
| Lack of Communication Between the Parties | 0.571 | 7 |
| Personal conflicts among labours | 0.561 | 8 |
| Low skilled/productivity level or unqualified labours | 0.561 | 8 |
| Changes in materials types during construction | 0.552 | 9 |
| Delay in the approval of contractor submission by the engineer | 0.542 | 10 |
| Inadequate Contractor Experience | 0.542 | 10 |
| Delay in approving shop drawing and sample material by client | 0.533 | 11 |
| Construction planning errors & equipment failure | 0.523 | 12 |
| Lack of consultant experience in construction projects | 0.523 | 12 |
| Sudden increase in quantity needed | 0.514 | 13 |
| Routine of government authorities and approvals | 0.514 | 13 |
| Labour exodus /evacuated from the region | 0.504 | 14 |
| Presence of Unskilled Labor | 0.504 | 14 |
| Equipment Availability and Failure | 0.495 | 15 |
| Mistake in design documents | 0.495 | 15 |
| Mistakes and discrepancies in contract documents | 0.495 | 15 |
| Duration is not enough for constructing the project | 0.495 | 15 |
| Change orders by client during construction | 0.495 | 15 |
| Difficulties in financing the project by contractor | 0.495 | 15 |

| | | |
|---|---|---|
| Conflicts between joint-ownership | 0.485 | 16 |
| Inappropriate Overalll Organization Structure Linking all Parties to the Project | 0.485 | 16 |
| Mistake and Discrepancies in Contract Documents | 0.485 | 16 |
| Unrealistic imposed contract duration | 0.476 | 17 |
| Quality assurance/ control | 0.476 | 17 |
| delay of payment from client | 0.476 | 17 |
| Delay in mobilization | 0.466 | 18 |
| Slow decision- making by owners | 0.466 | 18 |
| Delay in performing inspection and testing | 0.466 | 18 |
| Unforeseen Ground Condition | 0.466 | 18 |
| Lake of interest in the project | 0.466 | 18 |
| Rework due to workers mistakes | 0.457 | 19 |
| Construction Methods | 0.457 | 19 |
| Preparation and approval of drawing | 0.457 | 19 |
| Nationality and language of labours | 0.457 | 19 |
| Delay in Materials Delivery | 0.438 | 20 |
| Shortage and Material | 0.428 | 21 |
| Delay in progress payments to contractors /consultant | 0.419 | 22 |
| Change Order | 0.419 | 22 |
| Problems with Neighbors | 0.419 | 22 |
| Quality of Material | 0.409 | 23 |
| Major Dispute and Negotiations | 0.409 | 23 |
| Severe Weather Condition | 0.4 | 24 |
| Lack of labour | 0.4 | 24 |
| Price level changes of material in market | 0.371 | 25 |
| Contract Management | 0.371 | 25 |
| Difficulties in financing the project by contractor | 0.361 | 26 |



## V. CONCLUSION

The foremost delays corporations have been identified and ranked, which institution of contractor associated delays inside the pinnacle primary groups that make contributions to the reasons of delays. The pinnacle 5 maximum important elements causing delays are elements of put off in revising and approving design documents, delays in sub- contractor's work, negative communiqué and coordination, change orders through owner throughout production and inadequate contractors work. To limit delays in creation challenge, powerful strategic making plans, website online control and supervision and clean records and conversation channels are advocated. Demographic background of the respondents and previous research inside the similar scope justifies the reliability and validity of the design and the findings of this research, respectively. Inner consistency of the causes of undertaking delays become additionally examined and demonstrated thru chi –check information. Outcomes of the tests showed the reliability and validity of the research design and the findings.

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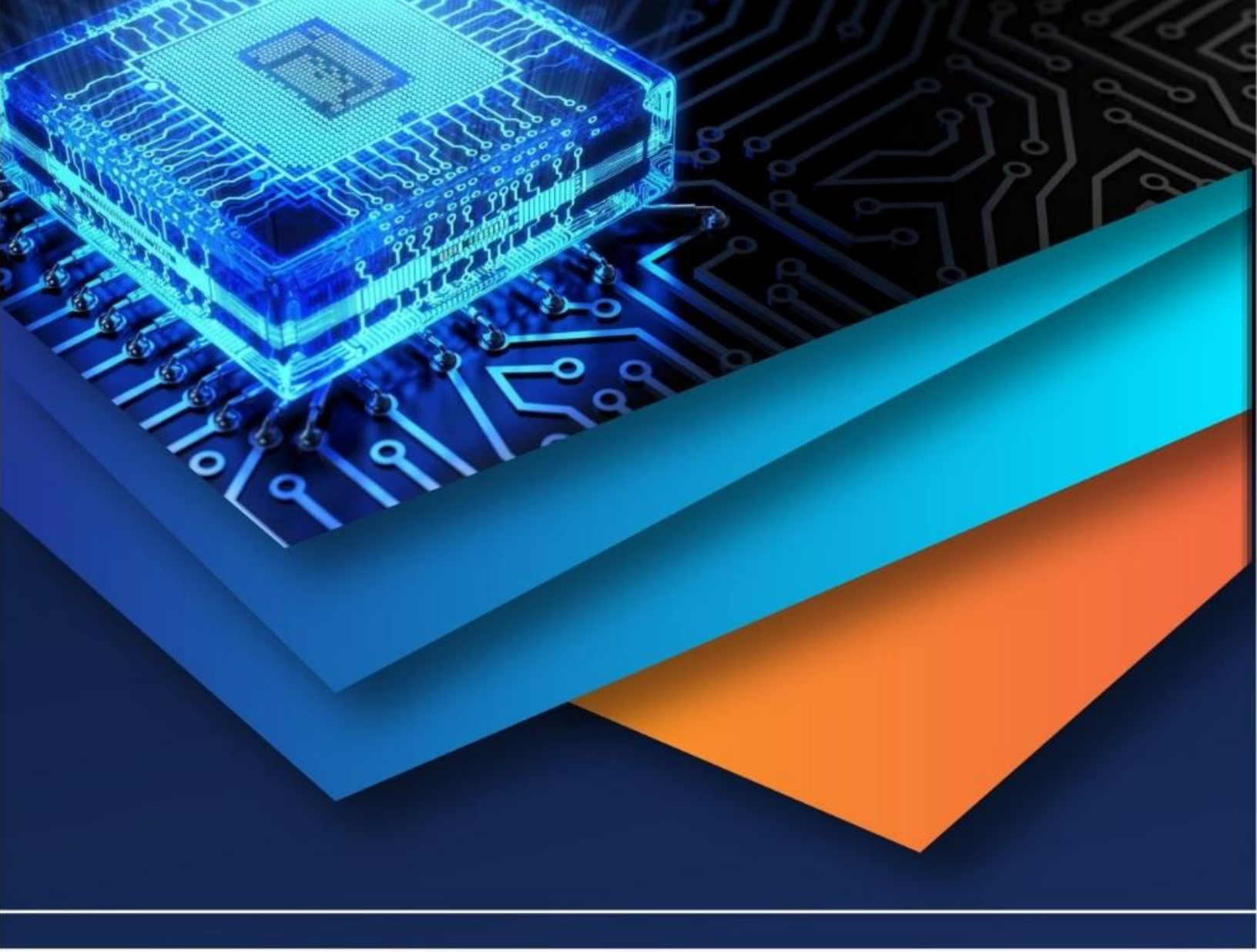

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IMPACT FACTOR: 7.129

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