

# Risk Based Integrated Project Delivery Method for Residential Building

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**Abstract**—Complex mega infrastructure projects are subjected to greater risks due to its unique features in various phases like feasibility, design, development, implementation and execution. These risks, if not carefully handled, treated and controlled can affect the project performance significantly. The main purpose of this work was to identify major activities of a building project and associated risks. In the present study of mega building project of India, it has been observed that based on the risks in the political related risk factor ranges from “moderate” to “high”. Risk mitigation measures in form of corrective and preventive mitigation measures have also been proposed. Over the last 25 years, the construction industry has become less efficient disdain having traditional project delivery system like IPD, DB, CMR & DBB. The amount of waste (man, money, material, time) in construction activity is not properly reducing due to the complexity of infrastructure projects. Integrated Project Delivery (IPD) is to improve project outcomes through a collaborative approach by early involvement of all parties.

**IndexTerms**—Risk Management, Project Management, Factor Analysis, Integrated Project Delivery.

## I. INTRODUCTION

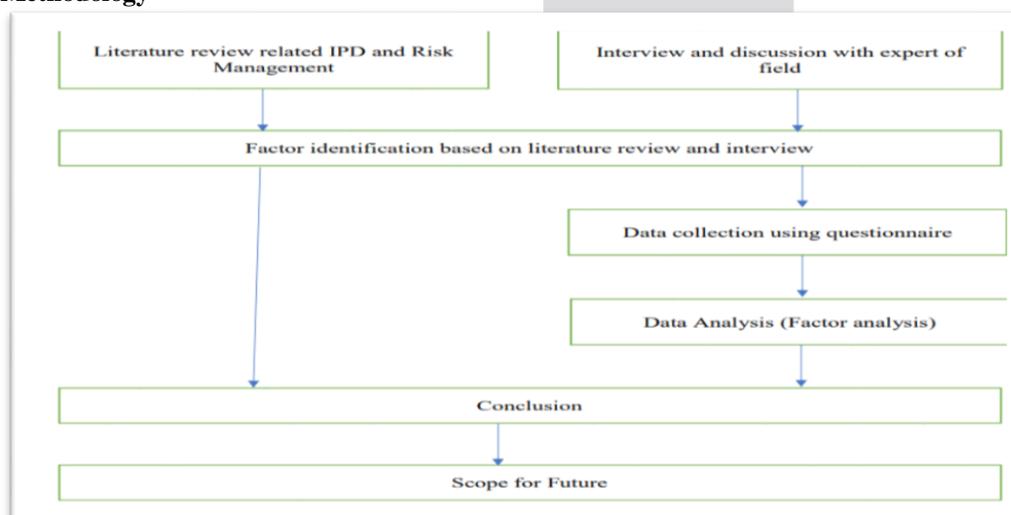
Risk is defined as any action which will affect the achievement of project objectives. Risk management is a technique which is used in many other industries from, IT related to business, automobile, pharmaceutical industry, to the construction sector. Risk assessment is systematic approach to protect the health and minimize danger to life, property and environment.

Risk assessment is an important part of risk management in major projects where huge amount of money is invested. There are number of problems in construction industry in India that are attributes to various factor. Project schedules are delayed, resulting cost overrun and suffering from poor workmanship, conflict is increasing resulting litigation in arbitration. A proper risk mitigation plan, if developed for identified risks, would ensure better and smoother achievement of project goals within the specified time, cost and quality parameters. Risk and uncertainties are more inbuilt in the construction industry compared to the other industries. Many industries have become more proactive about using risk management techniques in project. In 2019 Sinto&Saryana describe that risk management can help to promote progress of the activities within a project, instils confidence in the project, promote communication within the project and support the decision-making process within a project.

## II. NEED FOR STUDY

The construction sector plays a key role in the development and progress of any economy and is often considered as a leading indicator of the economic health of any country. Risk is involved in every business and the construction industry is no exception. There are number of problems in the construction industry in India that are attributed to various factors. Due to poor risk management and coping up with the risk during execution, it ultimately leads to time overrun and cost overrun which create the adverse negative impact on contractor and client ultimate objective of the project. Conflict is increasing, resulting in litigation and arbitration.

## Methodology



### III. DATA COLLECTION AND ANALYSIS

Data was collected through questionnaire survey having 9 points Likert scale.

Risk factors were identified using a two-step approach were a factor identification from literature review of existing risk research and was supplemented with interviews from the building project.

All the factors are identified in 2 steps

1. Literature Review
2. Interview and Discussion with expert

A Likert five-point scale (with 1 being least important and 5 being the most important) was used to elicit respondent's opinions about the importance of each variable. Respondents were encouraged to cite additional variables that were not mentioned in the potential list according to their experience.

The questionnaire was designed according to 5-point Likert scale adopted by the study 1= Unimportant, 2= Least Important, 3=Neither important nor unimportant, 4= Important and 5= Most Important. Respondents were given the option of answering the questionnaire in Google docs online that included in E-mail or completing it in hard copy. And collected of data has been done in this way. The questionnaires were filled by the differ field persons like Project Manager, Contractor, Site Engineer, Planning Engineer, Site supervisor, PM Consultant, Designer, Developers etc. the major of expected outcome addresses the effect of project delivery process indicators of risk management in terms of enhancing the efficiency by reducing the risk and other related to data collection tool and methods.

Data Analysis:

The general data analysis related to Integrated Project Delivery consist the number of respondents from the different fields, amount of experience in the field, knowledge regarding Risk- Management IPD and some general information which directly represent the effectives of people towards the awareness related to ipd and Risk Management due to construction activities.

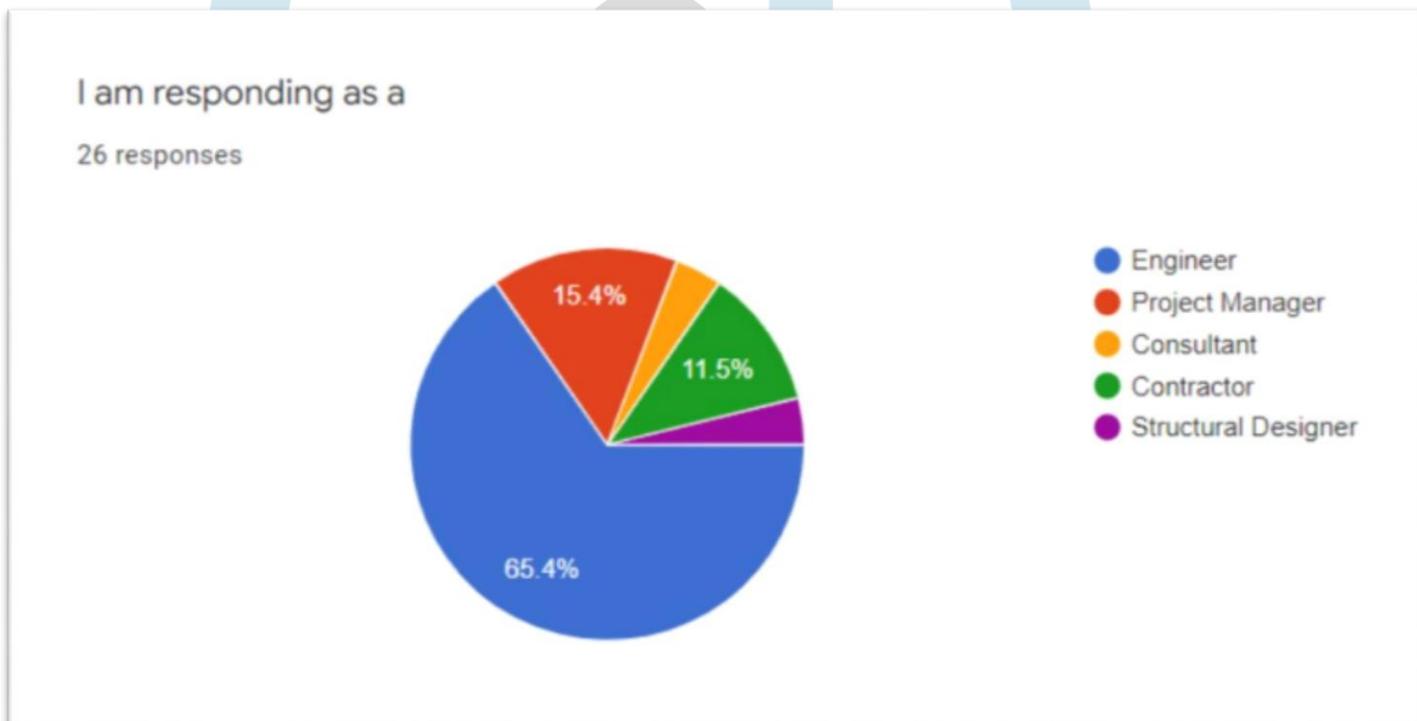


Figure 1 Field of the Respondent

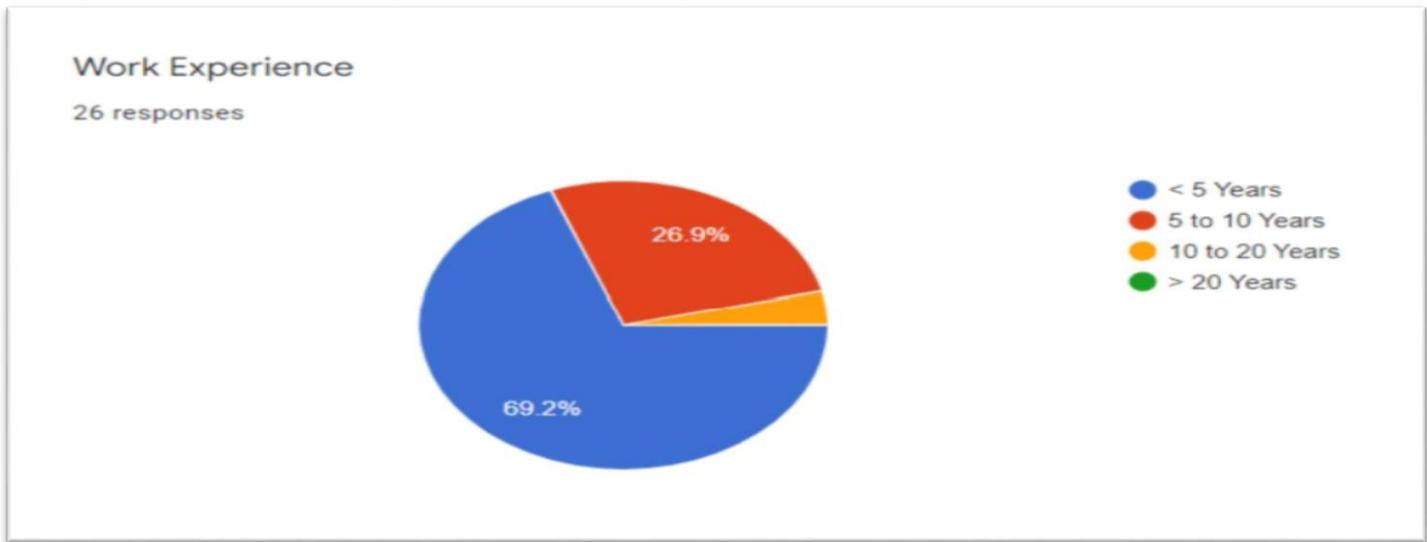


Figure 2 Work Experience

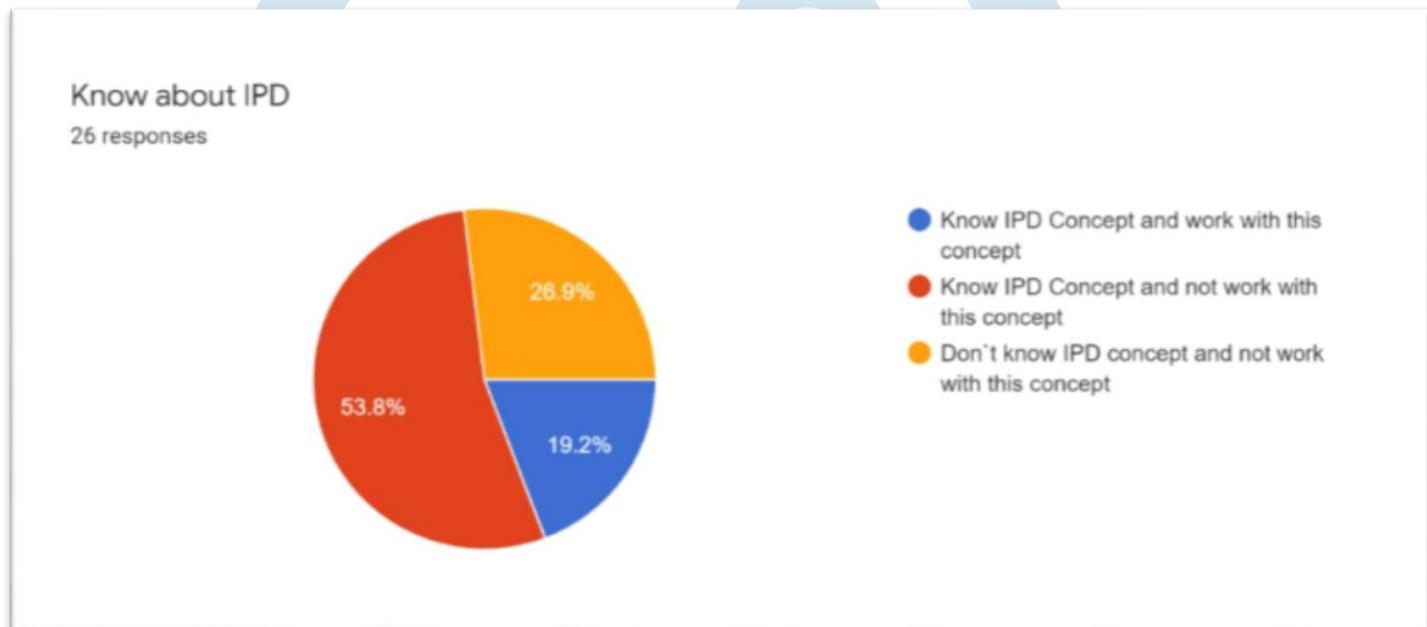


Figure 3 Know about IPD

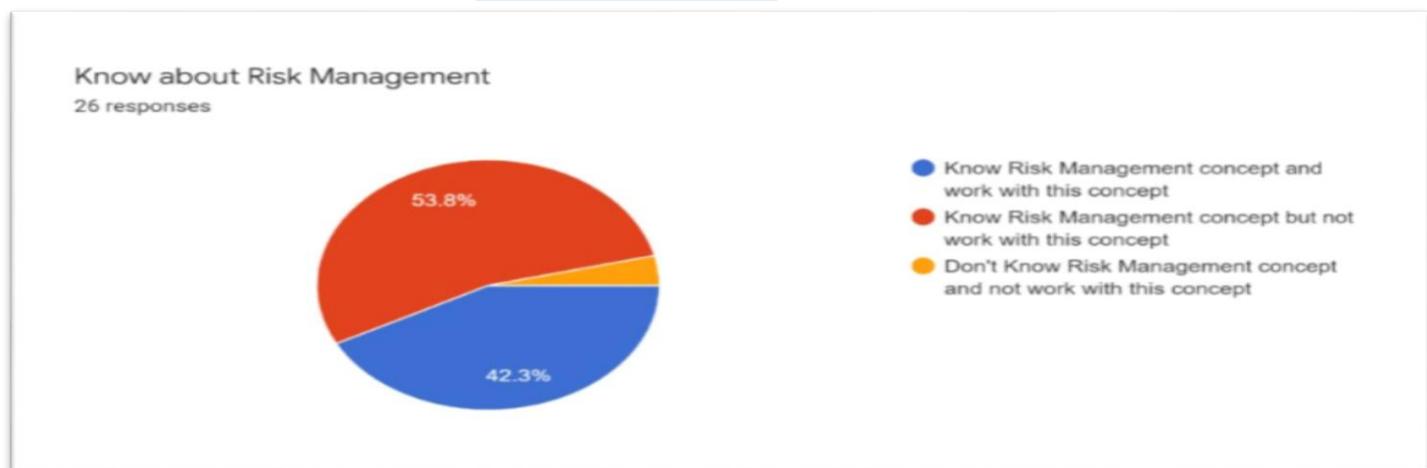


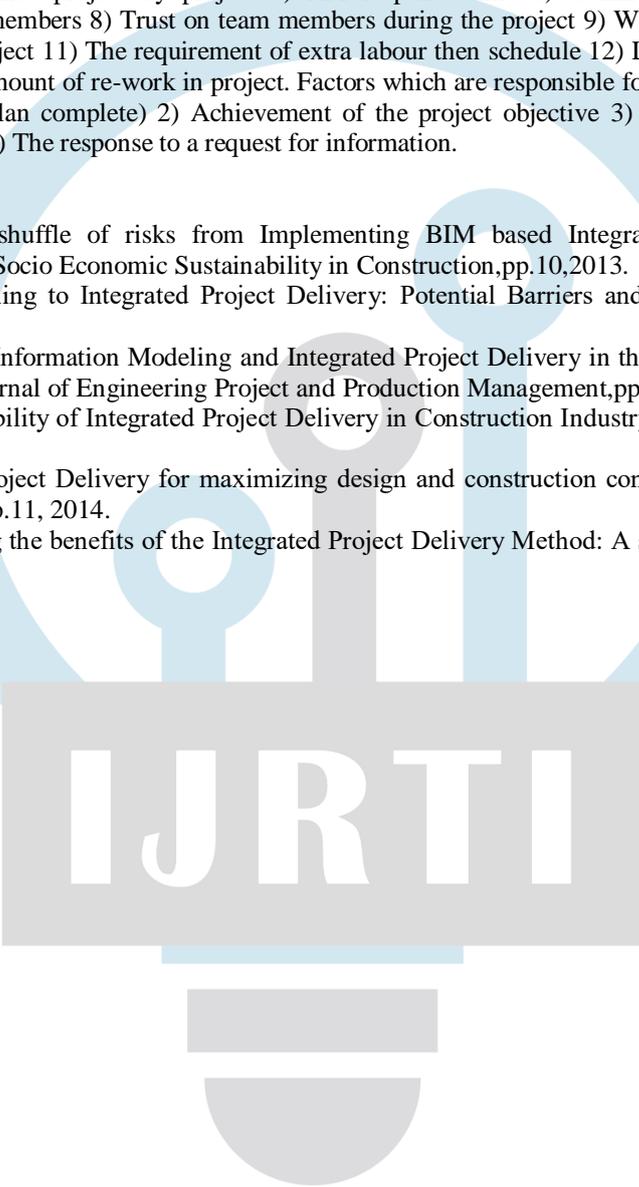
Figure 4 Know about Risk Management

#### IV. CONCLUSION

After the literature survey done for past decade through the research done by eminent researches, it is found that the research has been limited to identification of various types of risks involves in various phase of the project. But very nominal work has been done to quantify these risks. In this research work, total 20 numbers of factors related to IPD are identified from related literature review and interview with related field experts. From 26 expert 65.4% are engineers, 3.8% are Project Manager, 11.5% are contractor, 3.8% are consultant, 15.4% are Project Manager. 69.2% experts have less than 5 years-experience, 26.9% experts have 5 to 10 years-experience, 3.8% experts have 10 to 20 years-experience. 19.2% experts know the IPD concepts and work with this concept, 53.8% experts know IPD concept and not work with this concept, 26.9% experts don't know the IPD and not work with this concept. 42.3% experts know risk management concepts and work this concept, 53.8% experts know risk management concepts but not work with this concept, 3.8% experts don't know risk management concept and don't work with this concept. Factors which are responsible for successful completion of the project on schedule with design cost 1) Project delivery/implementation speed 2) Construction speed 3) System quality throughout the project construction speed 4) Continuous improvement in work performance project by project 5) RFI response time 6) Conflict resolution between teammates 7) Communication Between team members 8) Trust on team members during the project 9) Working in different teams 10) Amount of design changes during the project 11) The requirement of extra labour then schedule 12) Lost time injuries 13) Waste recycling rate 14) No blame culture 15) Amount of re-work in project. Factors which are responsible for successful completion of the project on time including 1) PPC (% plan complete) 2) Achievement of the project objective 3) Construction schedule growth 4) Re submission of change in design 5) The response to a request for information.

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