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Assess the Various Risks Associated in Build Operate Transfer (BOT) Infrastructure Projects: Case study of (Shirwal-Lonand-Phaltan-Baramati Road Project)

Sagar Shivaji Chavan[1], Ganesh P. Jarad[2]
[1]*Student, Master of Construction & Management TSSM's Padmabhooshan Vasantdada Patil Institute of Technology, Bavdhan, Pune, India*
[2]*Asst. Prof., Department of Civil Engineering TSSM's Padmabhooshan Vasantdada Patil Institute of Technology, Bavdhan, Pune, India*

Abstract: ***In INDIA, BOT (Build Operate Transfer) approach has given an undeniably well known task financing to push toward framework improvement. There are numerous complexities in ventures on account of the assortment of elements in undertaking's pattern and furthermore the reliance of task. Because of the complexities and their drawn out working, the tasks meet with vulnerability and various dangers.***
This exploration study is to concentrate on the Indian foundation segment with an accentuation on various undertakings hazard factor . The advancement of the development area in india has been compratelly moderate .
BOT(Build Operate Transfer) implies the administration move the admission to Private Company and the organization is liable for building, working the undertaking, and afterward move the task back to the legislature when the concession time frame terminates. The principle reason for this paper is to explore monetary hazard, specialized hazard, unique and support chance, remote trade risk and commercial chance in BOT projects. BOT venture is exposed to numerous dangers lastly it is changed over into money related risk.base on the audit the basic hazard are found :- change in law, cost overrun, delay in delay in endorsement , development plan budgetary shutting , traffic modification , natural hazard , and so forth
The reason for this paper is to examine the hazard related with BOT plans in India
Keywords: BOT (build opperate transfer), Risk, PPPs (public private partnership) , Infrastructure construction industry

I. INTRODUCTION

Civil infrastructure is fundamental to the nation's financial growth. Infrastructure might be viewed as the skeleton on which the society is built. It includes 1) highways, 2) railways, 3) ports, 4) bridges, 5) hydraulic structures, 6) power plants, 7) tunnels, 8) municipal facilities like sanitation and water supply, and 9) other facilities serving public needs. Sufficient funding is required to construct and maintain the requisite infrastructure.

The instant need for such projects coupled with budget shortages experienced by open organizations has encouraged the use of innovative financing. Conventionally open foundation has been done by the open using the DBB procurement system. With the expanded interest for creative turns of events and for keeping up existing tasks, public funding resources couldn't stay up with the demand

Public-private partnerships (PPPs) were looked for as elective delivery systems to address some of the funding problems. PPP courses of action are used broadly and have found considerable acceptance in several parts of the world. India has seen a fast increment in private investment in infrastructure since.

PPP program has grown rapidly in the now a years . Several arrangements of PPPs have been used including the basic build-operate transfer (BOT).

Based on the original BOT concept, diverse variations have evolved in many countries.

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Few of them are listed here.

1) BOO (build-own-operate),
2) BLT (build-lease-transfer),
3) BOOM (build-own-operate-maintain),
4) BOOT (build-own-operate-transfer),
5) BOOTT (build-own-operate-train-transfer),
6) BTO (build-transfer-operate),
7) DBFO (design-build-finance-operate),
8) DBO (design-build-operate),
9) DBOM (design-build-operate-maintain),
10) DOT (design-operate-transfer),
11) ROO (rehabilitate-own-operate),
12) ROT (rehabilitate-operate-transfer),
13) DOT (develop operate transfer).

II. OBJECTIVES

A. To Develop a Better comprehension of the Basic and Essential Concepts associated with Build Operate Transfer (BOT) Infrastructure Projects.
B. To Identify the Risks related in Build Operate Transfer (BOT) Infrastructure Projects.
C. To classify the Various Risks related in Build Operate Transfer (BOT) Infrastructure Projects.
D. To Assess the Impact of the Associated Risks on Build Operate Transfer (BOT) Infrastructure Projects.
E. To lead field overview by postal poll and individual meetings of the specialists to recognize chief reasons for delay for BOT ventures, and to get the impression of three fundamental members: proprietor, expert and temporary worker to the variables causing venture delays.
F. To evaluate Time Overrun engaged with BOT by considering a particular instance of BOT street venture.

III. SCOPE OF THE STUDY

The following are the points, which form the scope for this study:

A. To comprehend the Build Operate Transfer Projects and the developing requirement for same in Indian Scenario.
B. To comprehend various sorts of dangers.
C. Identify and comprehend the Risks in various stages in Build Operate Transfer ventures.
D. To comprehend distinctive Stake Holders in a Build Operate Transfer Project and Risks from every ones perspective.
E. To study the Time Overrun in Build Operate Transfer ventures and it's Impacts on the task.
F. To get ready and suggest an agenda for ID of dangers in the activities viable.

IV. LITERATURE REVIEW

A. *Risk Management in BOT PNG Toll Plaza*

International Research Journal of Engineering and Technology (IRJET) 05 May 2019 Monika K.Thombare , Prof. Harshita Ambre
This paper recognize basic hazard arranged by significance are: delay in endorsement, change in law, cost overun, dispatch imperative, land securing and remuneration, enforceability of agreements, development plan, money related closing.it can likewise presumed that the inner dangers that gave the most elevated effect on BOT venture were budgetary dangers, operational issue, specialized and configuration dangers.

B. *The Third Bosphorus Bridge and The Northern Marmara Motorway Project*

Int. J. Transp. Der Integer.(2018) F. BUYUKYORAN & S GUNDES Department of Architecture, Mimar Sinan Fine Arts University, Turkey
This examination seriously attempted to concentrate on the utilization of the BOT expressway model practically speaking, Although the discoveries can't be summed up, the exercises learned offer significant bits of knowledge for both private and open segment suppliers of transportation ventures in Turkey and in other creating nations.

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C. Critical Success Factors for build-operate Transfer (BOT) Projects in China

Irish Journal of management (2017) Yang'. Tahir M Nisar and Guru Prakash Prabhakar 'University of Bristol, UK

The focus point of this investigation is on making a rundown of CSFs for China's BOT activities to help the Chinese government ard venture organizations to make progress in BOT ventures. Various perceptions are accounted for here.

D. Risk Planning in Construction of Highway Project: Case Study

International Journal of Latest Research in Engineering and Technology (IJLRET) (3 March 2016)Aitwar Vishambar', Sontakke Kaustubh Patel Kartik, Ashwini Salunkhe Student &"Asst. Prof. (Department of Civil Engineering. Dr. D.Y Patil Institute of Engineering & technology, Pimpri, Pune, India)

It was found from the contextual investigation that the stream outline of the diverse action for better arranging of hazard the board is essential.

E. Research Paper on Risk Analysis of BOT Scheme

International Journal of All Research Education and Scientific Methods (IJARESM) (jully-2016) Mandeep Sindhu', Mr. Paramjeet Malik Student& Assistant Professor, Department of Civil Engineering, Sat Priya Group of Institutions. Rohtak. Haryana

The traffic projections with the end goal of productivity of task depend on the traffic investigation of State Highway. The anticipated financials are vigorous to support the obligation reimbursement and intrigue repayment. On the premise of above investigation and subject to the dangers. obligation adjusting ability of the Project is viewed as palatable and sufficient. In light of the different working financing and administrative suppositions, the Project State Highway is relied upon to accomplish the anticipated benefit

F. Risk Analysis and Mitigation in BOT Project

International Journal of Innovative Research in Science (9, September 2016) PG Student Assistant professor, Head of the Department of Civil Engineering, Shri Shirdi Sai Institute of Science and Engineering, Anantapur, Andhra Pradesh, India.

As an end, danger examination and balance is a basic system crucial with a particular ultimate objective to achieve a productive undertaking financing.

G. Risk Assesment of BOT Projects

Glacier Journal Of Scientific Research (MAY 2015) Miss. Sharmila Manel, Dr. S. S. Pimplikar P. G. Student &Professor & Head, Department of Civil Engineering, Maharashtra Institute of Technology, Pune.

illustrates the PPP project carries higher risk throughout the project life. One of the main reasons of high risk is long project duration.

H. Risks Assessment in Real Estate Investments in Times of Global Crisis

WSEAS TRANSACTIONS on BUSINESS and ECONOMICS (2014) CHIARA D'ALPAOS', RUBINA CANESI PICEA, Department of Civil Environmental and Architecture Engineering, University of Padova.

The examination represents the PPP venture conveys higher hazard all through the task life. One of the fundamental reasons of high hazard is long venture length.

I. Risk Assessment in BOT Project Financing

International Journal of Engineering Research & Technology (UET) (June – 2014) Mrs. Savita Achyut Jangale Student Master of civil Engineering D.Y. Patil College of Engineering, Akurdi , Pune, India.

This paper concentrate on Real bequest improvement is a unique multiphase procedure where each stage includes different risks,differently designated between partners

J. Built-Own-Lease-Transfer (BOLT): "A Public Private Partnership Model that Bridges Gap of Infrastructure in Urban Areas"

International Journal of Civil Engineering Research (2 NOV 2014) Nirali Shukla', Riki Panchal and Neel Shah 'Civil, Pandit Deendayal Petroleum University, Raysan, Gandhinagar, INDIA.

This paper studies on the current scenario of PPP suggests that it is limited only in transportation sector incorporating BOT and BOT Annuity models in most of the developing countries.

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K. Transfer Projects Using Fuzzy Logic

Iranian Journal of Management Studies (IJMS) (2, July 2014) Prof: Farnad Nasirzadeh' Prof: Mostafa Klhanzadi, Majid Alipour .Assistant Professor, M.Sc. Student, Dept. of Civil Eng., Iran University of Science and Technology. Tehran, Iran

This paper concentrates on key boundary of BOT ventures is the concurrence on the length of concession period. A drawn out concession period may bring about the administration's misfortune. Then again, if the concession time frame is excessively short, the financial specialist would either dismiss the agreement offer or would be compelled to expand the activity expenses of the undertaking so as to recoup the speculation costs and to make a specific degree of benefit. Thus, the hazard trouble brought about by short concession period would be moved to the individuals who utilize the offices.

V. RISKS IN BUILD OPERATE AND TRANSFER (BOT) PROJECTS

A. Risk

A risk can be defined as exposure to the chance of monetary and budgetary addition, physical harms or injury as a result of the uncertainties associated with pursuing a particular course of action.

Risk can also be defined as all the uncertain factors which will have a combined negative impact on the objectives of the project. Another point of view is that risk arose when it was possible to make factual evaluation of the particular event .Thus risk could be quantified as

Risk= Probability of Event * Magnitude of Loss or Gain in BOT projects

B. Different Perpespective of Risks

1) Lender's Perspective of Risks

This is mostly associated with the bankability of the venture. They are as follows:-

a) Clear legal basis and clearances of approvals for the project
b) Control over revenue stream
c) Certainty over Project Costs
d) Monitoring of Project costs
e) Participation of major stakeholders
f) Adequate risk allocation
g) Step in rights

2) Developer's Perspective of Risks

This is the perspective we are focusing on in this report.

a) Ability to implement the project in a commercially viable manner
b) Certainty of costs
c) Return on investment
d) Distribution and management of risks
e) Control over revenue stream

3) Government's Perspective of Risks

This perspective is a broader and more significance is given to the impact to society:-

a) To prevent unjust enrichment by the Developer
b) Prevent Abuse of monopoly
c) Environmental issues and impact
d) Rehabilitation and Resettlement
e) Social impact of the project

4) Contractor's perspective of Risks

a) Financial solvency of the developer
b) Policies and framework of the developer's Firm
c) Contractual liabilities
d) Mobilization Advances
e) Incentives and bonuses if any and penalty clauses

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C. *Types of Risks*

1) *Market and Revenue Risks*

a) Revenue risk is the uncertainty in relation to the revenue that a project would actually generate which will affect the means of finance and thus return on investment. This can happen in two cases:-

b) If the quantum of sales projected for the facility does not take place as predicted.

c) If the rentals of the facility are not priced correctly

2) *Design Risks:* This Risk identifies with any deformity in the structure of the task or the plan prerequisites specified for the venture .This is an in born risk in the undertaking as it is exceptionally hard to convincingly find out that harm to the office is really caused because of the deformity in the structure boundary or the plan itself.

3) *Construction Risks:* The construction risks are essentially a bundle of various individual risk factors that adversely the construction of a project within the time frame and costs projected and at the standards specified for the facility. Construction risks associated with projects are:-

a) *Cost Overruns and Time and Quality:* These risks affect the company directly. The available activities are to either guarantee exchanged harms from the contractor or draw down standby finance from the project lenders.

b) *Cost and Scope of Identified but Unspecified Work and Variations:* These risks straightforwardly to the organization to the contractor and the company and represent a potential area of future disputes.

c) *Increased Financing Costs:* This risk streams legitimately to the organization, which may attempt to mitigate the risk either by a new injection of equity or subordinated debt from the sponsors. Alternatively, the company may draw down stand by finance from project lenders.

d) *Contractor Default:* This is a risk to the company, which may claim liquidated damages from the contractor or make a claim against the contractor's performance bond and bonding company.

e) *Default by Company:* This is the flip side of the prior risk. This risk is to the contractor, with the primary mitigating measure being claim of liquidated damages from the company.

f) *Environmental Damage:* This risk accrues to the company primarily and may result in claims on insurers or the party causing the damage.

g) *Force Majeure Event:* This risk accrues to the concession company primarily and would result typically in a claim to the project insurers.

4) *Operating Risks:* Some of the risks we may look in a project apply additionally when there is arrangemen of operations and maintenance .These risks flow directly to the company .Some of them are:-

Performance Risk- The completed facility cannot be effectively operated or maintained.

a) *Operation Cost overrun*- The operating costs exceed the original estimates

b) *Force Majeure or Environmental Damage*- In this type of event the company would most likely place a claim with the insurers because risks of these types would be normally insurable.

c) *Default*- The default may be caused by the actions of a third party, in which case the company could make claims of damage against that party.

5) *Financial Risks:* Loan cost chance is one of the major money related dangers that could compel the task to endure extra financing costs. This risk may be significant in projects that have huge aggregates borrowed and the long span of projects, with some loans extending over a period of several years. Loans are usually given at fixed rate of interest to reduce the Loan cost. In addition the finance package may include hedging facilities for example by way off inancing cost trades or loan fee tops

6) *Political Risks:* The project organization and loan specialists the risk that the project execution maybe negatively affected by acts of the government or the host’s country’s legislature

a) Changes in Policies

b) Development Approvals

c) Adverse government action or inaction

d) Increase in taxes

e) Unplanned competition

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7) Legal Risks

Some of the legal risks related to a large project are:-

a) Title/lease of property
b) Ownership of assets
c) Corporate and security structure
d) Financial failure
e) Breach of financing documents
f) Enforceability of security

8) Environment Risk: These are risks relating to occurrence of environmental incidents during the course of Implementation of the project. These risks are generally within the control of the Construction and the company. This risk has increased due to the presence of strict legal liability in relation to such environmental incidents, which can result not only in adverse effects on the financials of a project but may also cause a closure of any work in relation to the project.

9) Force Majeure Risks: These are risks regarding the events that are outside the control of any party and cannot be reasonably prevented by the concerned party .These risks generally arise due the causes extraneous to the project .The defining of force majeure events includes:-

a) Natural Force Majeure events
b) Direct political force majeure events
c) Indirect political force major events

Natural Force majeure events comprise of all events that can be attributed to natural conditions or acts of God such as earthquakes, floods, cyclones and typhoons these risks should be shared equally by both parties.

Direct political force majeure events are events attributable to political events that are specific to the project itself such as exploration, nationalization. Indirect political force majeure events are events that have their origin in political events but are not project specific such as war, riots, etc.

VI. METHODOLOGY

This study adopted a well-defined methodology which is as follows"

1) Identification Phases of BOT Projects
2) Identification risks involved at every phase
3) Preparation of questions for every stage & Checklist
4) Circulation of checklist, site visits, interviews
5) Collection of Checklist
6) Analysis of responses
7) Observation & Discussion
8) Conclusion

A. Identification Phases of BOT Projects

Literature referred are deals with the project risk involved while execution only, but risks involved in preconstruction phase and post construction phase are neglected. This study involves the study of risk according to their life cycle. It is prime work to recognize periods of life pattern of venture. According to literature and books, following are the life cycle of project;

A. Conception & Definition Phase	B. Planning Phase
C. Execution Phase	D. Closure of Project

1) Conception & Definition Phase

This phase involves following activities;

a) Concept of the project
b) Scope of the project
c) Category of the project
d) Tendering and bidding
e) Work order

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2) Planning Phase

This phase involves following activities;

a) Allocation of sub contractor
b) Estimation
c) Cost estimation
d) Scheduling
e) Presenting milestones
f) Quality & safety plans
g) Cash flow

3) Execution Phase

This phase involves following activities;

a) Priorities of work
b) Work breakdown structures
c) Resource allocation
d) Daily quantity consumption
e) Maintaining daily progress
f) Achieving desired quality and safety

4) Closure

This phase involves following activities;

a) Handing over and taking over
b) Maintenances
c) Extra work claims

Life cycle of the projects for real estate and for accuracy, this study sepreated phases into six categories. This prompts a precision at each arrangement of movement (stage) in study and improvement in examination. These phases are set by over a discussion with real estate experts and literature. Followings are the phases of life cycle:

STAGE – I: CONCEPT AND THE FEASIBILITY STUDY
STAGE – II : FUND RAISING & THE FINANCIAL CLOSURE
STAGE – III : TENDERING, BIDDING & TO THE AWARD OF PROJECT
STAGE – IV : PROJECT PLANNING & THE MAIN PROCUREMENT
STAGE – V : CONTRACT EXECUTION, MONITORING AND THE CONTROL
STAGE – VI : PROJECT CLOSURE, SALE / OPERATIONS AND THE MAINTENANCE

B. Identification Risks Involved At Every Phase

Risk required at each stage is distinguished as far as issue explanation. Risks were identified on the basis of literature review and interviewing some professionals who are working in the field from the last 10yrs.

The study of following point is very necessary;

1) Risks identified or not in particular phase?
2) Which types of risks are involved?
3) Categories of risks need to be identified?
4) Hazards of risks
5) Severity of risk
6) Impact on project
7) Cost impact of risk
8) Time impact of risk
9) Occurrence and Probability of risk

These focuses are talked about and investigate, following significant gatherings are chosen out of over this are;

a) Can Detect this Risk in Advance
b) Rating for Severity of Loss due to this Risk

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c) Rating for Probability
d) Impact on Project Delay

VII. CONCLUSION

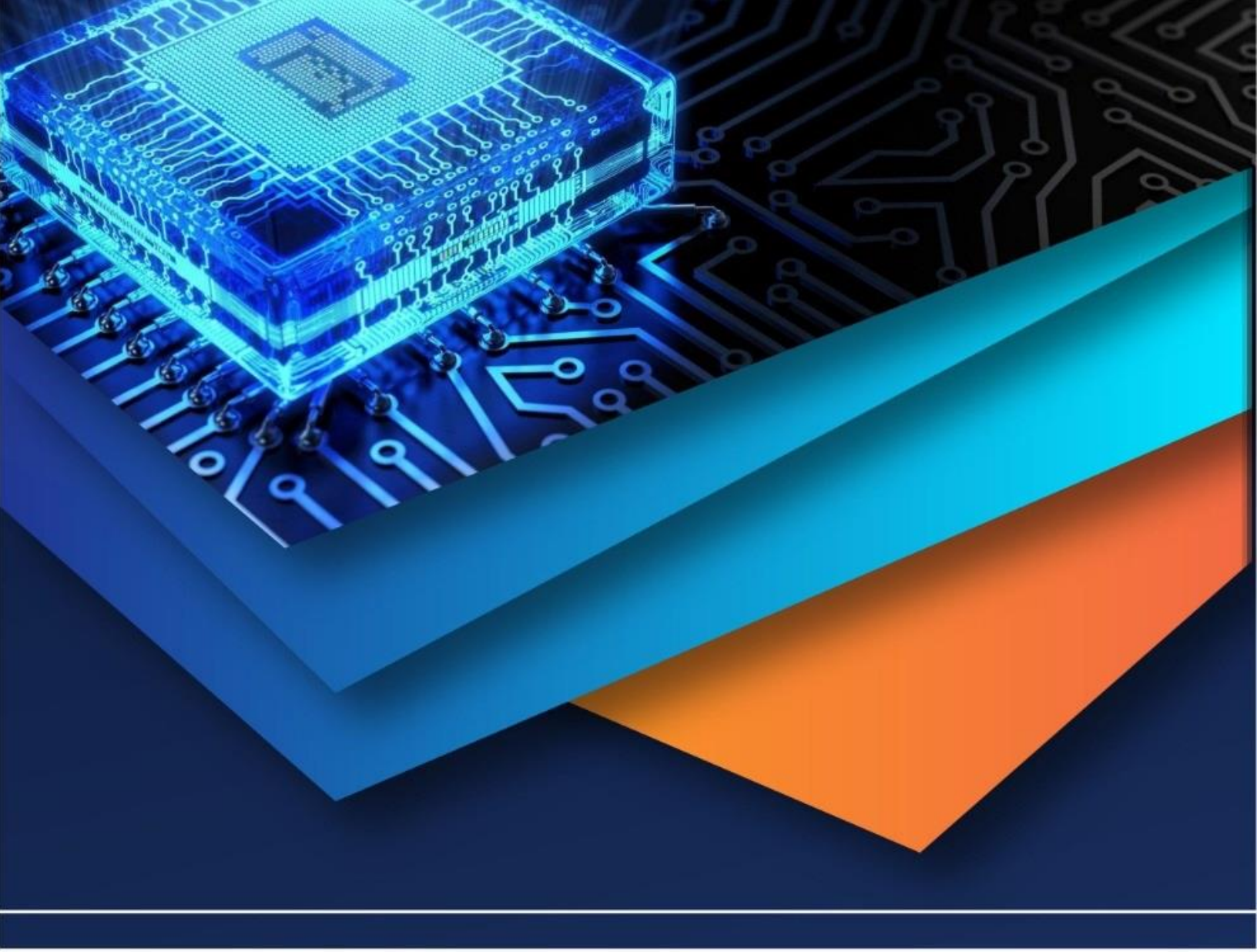
In this reaearch, the basic dangers related with India's BOT ventures were explored. The main conclusions are as follows:

A. The identified critical risks in order of importance are: delay in approval, change in law, cost overrun, dispatch constraint, land acquisition and compensation, enforceability of contracts, construction schedule, financial closing, tariff adjustment, and environmental risk.
B. The risks are assessed through the various life cycle phase of a BOT project and a Checklist and Questionnaire are prepared which can be circulated to personnel's working on Different BOT projects to pick out the critical risks affecting the Time and Cost overrun of BOT projects.
C. Once the critical risks affecting the Time and Cost overruns of BOT projects are identified, analysis can be done to see the impacts of these critical risks on BOT projects and accordingly mitigating measures can be suggested.

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