



A STUDY ON TIME AND COST OVERRUN OF NATIONAL HIGHWAY PROJECTS IN THE CURRENT DIGITIZATION ERA

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Abstract :

Time overrun and cost overrun is the greatest impediment to the completion of National Highway Authority of India projects. NHAI is contributing a lot to the socioeconomic progress of India by developing national highways. The government has set an ambitious target for the next five years with huge investments. NHAI is ready to accept new technology, innovation, etc. however, NHAI faces problems of time overrun, cost overrun & claims in current digitization era. The purpose of this study is to analyze the status of the NHAI project whether it would be completed on time and cost or having time overrun and cost overrun problems. In this study, the data were extracted from www.pppindia.gov.in (GOI, 2019) a website handled by the department of economic affairs government of India. 322 project data were analyzed that whether it would be completed on time, within cost, or the project have problems with time overrun, cost overrun or both. Many researchers had found different reasons like low level political support (Maemura et al., 2018), inadequate contract clarification, speed of tender, land acquisition, etc in this paper Authors have analyzed different time overrun and cost overrun statuses of NHAI projects for various states of India with different financial models. Only 37.26% of projects were completed within time and cost. It is high time to do a serious investigation into the problem of Time overrun and cost overrun of NHAI projects and find the root cause of the issue.

Index Terms - Timeoverrun, Cost overrun, NHAI, digital era.

I. INTRODUCTION

In India, a statutory organisation called NHAI is in charge of upgrading infrastructure. Roadways are essential to the socioeconomic development of every nation. The NHAI is making significant progress in this area. The nation's main thoroughfares for interstate transportation of people and products are known as national highways. There are currently 1, 19,435 km of motorways and national highways in the nation. The National Highway Authority of India set a target of 7400 kilometers for the year 2018–19. Under the "Bharatmala Pariyojana," the government has set an ambitious goal of building in the next five years, 34,500 km of national highways would be built at a cost of Rs. 5,35,000 crore. (NHAI, 2017) The NHAI is always open to new innovations, technological advancements, the green revolution, etc. An electronic toll collecting system that uses radio frequency identification technology has been approved by NHAI. Fastag technology has handled efficient toll collecting to reduce vehicle wait times. The effectiveness of the GPS-based toll collecting system is also being monitored by the NHAI. The NHAI is building roads at a rate of 28km per day. They are concentrating to get more and more done. The NHAI project is prioritised more in the Indian Union Budget. Improvements in planning and execution processes, IT utilisation, contemporary survey techniques including the use of drones, and digitization of everything are the main areas of concentration for NHAI. But, at the same time, high-value claims, arbitration proceedings, and late completion of projects are all on the rise. Only five of the 17 highway projects the National Highway Authority of India undertook between 1998 and 2003 with the help of the private sector were finished on schedule, according to the Government of India's performance audit (Subramanyan et al., 2012) report. NHAI faces a lot of problems as Time overrun, Cost overrun, etc. for the development, construction, and maintenance of national highway projects.

II. OBJECTIVE OF THE STUDY

To identify & analyze time and expense overruns in NHAI projects in the current digital era.

III. LITRATURE SURVEY

Many researchers found that there were many reasons that occurred for time overrun and cost overruns. The review of different literature was done through previous findings. Out of that some key paper reviews and findings are as follows:

Islam H.ElAdawayet compared the Saudi public works contract to U.S. federal acquisition law in terms of modification orders, time extensions, liquidity harm, various site conditions, and dispute settlement. The comparison between the two authorities' similarities and differences was evident.(El-Adaway et al., 2018)

Maemura Yu et. had been given root causes such as poor levels of political support, low levels of owner internal or foreign project management experience, low utilisation or relational approach, and inadequate contract clarifications made during the pre-contract stage. (Maemura et al., 2018) Kevin Walsh created a set of standards for the use of common language in organisational rules. Creating and educating a reviewer tasked with spotting questionable wording and bringing it to the notice of the company's decision-makers. developing warning signs and must-have provisions that must either be included in every contract or avoided. locating and gathering the company's lessons learned in order to learn from and improve upon its errors.(Walsh, 2017)

Malek mishmash et al. studied the most prevalent causes of claims, which included poor design, a lack of time for tendering and building, and customer changes. The researcher's suggested mitigation method was to allow the client and designer more time to thoroughly study the design. They additionally suggested that enough time be provided for contractors to become familiar with the projects and accurately price the work during the tendering phase.(Mishmish & El-Sayegh, 2018)

Prasad K.V. et al had shown that the primary causes of delays in highway or transportation projects were issues with land acquisition and utility-related delays. The analysis has shown that the reasons for delays and how important they are to each project differ. The development of sound contract terms, the project timeline, documentation, and records were measured for the delay in the settlement of claims during pre-contract negotiations.(Prasad et al., 2018)

Kishore Kumar et al provided the reasons for the delay, most of which came from pre-construction work including land purchase, utility relocation, etc.(Kishorkumar M., 2012) Subramanian H.et al a greater range of 9.5% to 13% with as high as 3.3% standard deviation for risk relative to the project, architect consultant, contract conditions, external environment, etc. In the Indian construction business, a deliberate strategy for managing project-specific risk in conjunction with good contract administration can reduce total risk to a higher extent.(Subramanyan et al., 2012)

Because different crucial success criteria have considerably varying effects on the schedule, money, and quality level of building projects. So, the project manager cannot be expected to manage the issues brought about by these elements by concentrating simply on schedule- or budget-related issues, nor can he or she assume that time, cost, and quality are all equally impacted by them.(Larsen et al., 2016)

When compared to other sectors, it has been shown that the road transportation and highway sector experiences the highest amount of cost and time overruns. Although the causes of cost and time overruns have some in common, the effects and frequency of their occurrences vary from project to project and cannot be generalised. In general, time delays result in cost escalations in large-scale infrastructure projects. Longer-term projects are more likely to experience variances or changes in scope, climate changes, and inflation, which can result in time and expense overruns.(Narayanan et al., 2019)

As a guide, consider the top ten elements of delays are working during the rainy season, flooding, impacts on people's land, awarding the project to the lowest bidder, frequent equipment breakdowns, poor site organisation, management, and supervision, poor ground and terrain, inadequate contractor technical staff and project teams, delayed progress payments, and low productivity labour are some of these factors.(Santoso & Soeng, 2016)

IV. METHODOLOGY AND DATA COLLECTION

The Methodology was adopted as per fig.no.1 Data were extracted from the website which is handled by the department of economic affairs government of India. www.pppindia.gov.in(GOI, 2019) There were lots of project data available. For our research data were filtered only for government infrastructure projects, All types of PPP models, Sector: Transport – Roads and bridges, Location – all states, Status – Under construction, completed, pre-construction, operation, and maintenance, etc., Project cost, Date of award of the tender, etc.

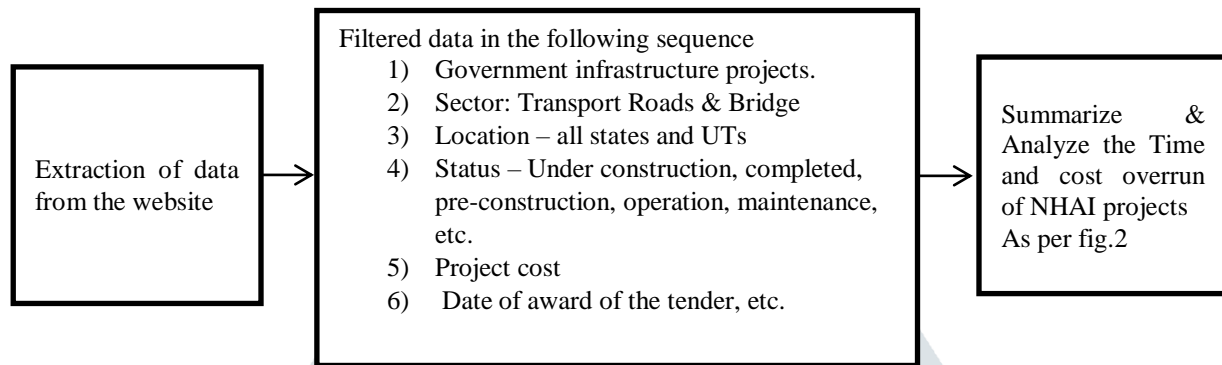


Figure 1 Research methodology
(Source: Compiled by author)

The data for NHAI was summarized. There were 322 no National Highway projects available in July 2019 in different states of India. Analysis was carried out as per fig.2 methodology. All projects were put as per figure 2 whether the project was completed within time if yes then check whether it would be completed as per cost if yes then the project completed within time and cost, else may be completed in time and not completed within budget wise verse The data were sorted out based on the different types of a model like for BOT, BOLT, etc only as per fig.2and try to find out that whether the project completed as per the schedule and within budget or time overrun and cost overrun was available in this digital era.

All data were transient as per figure2. Every time put a functional argument and verify for time overrun and cost overrun. Data were analyzed for all the available financial models i.e. Build-Operate-Transfer (BOT), Build-Operate-Transfer (BOT) Annuity, Build-Operate-Transfer (BOT) Toll, Design-Build-Finance-Operate-Transfer (DBFOT), Design-Build-Finance-Operate-Transfer (DBFOT) Toll, Management Contract (O&M) with respect to time and cost overrun at different states. The final status of time overrun and cost overrun was found out with respect to financial models in different states.

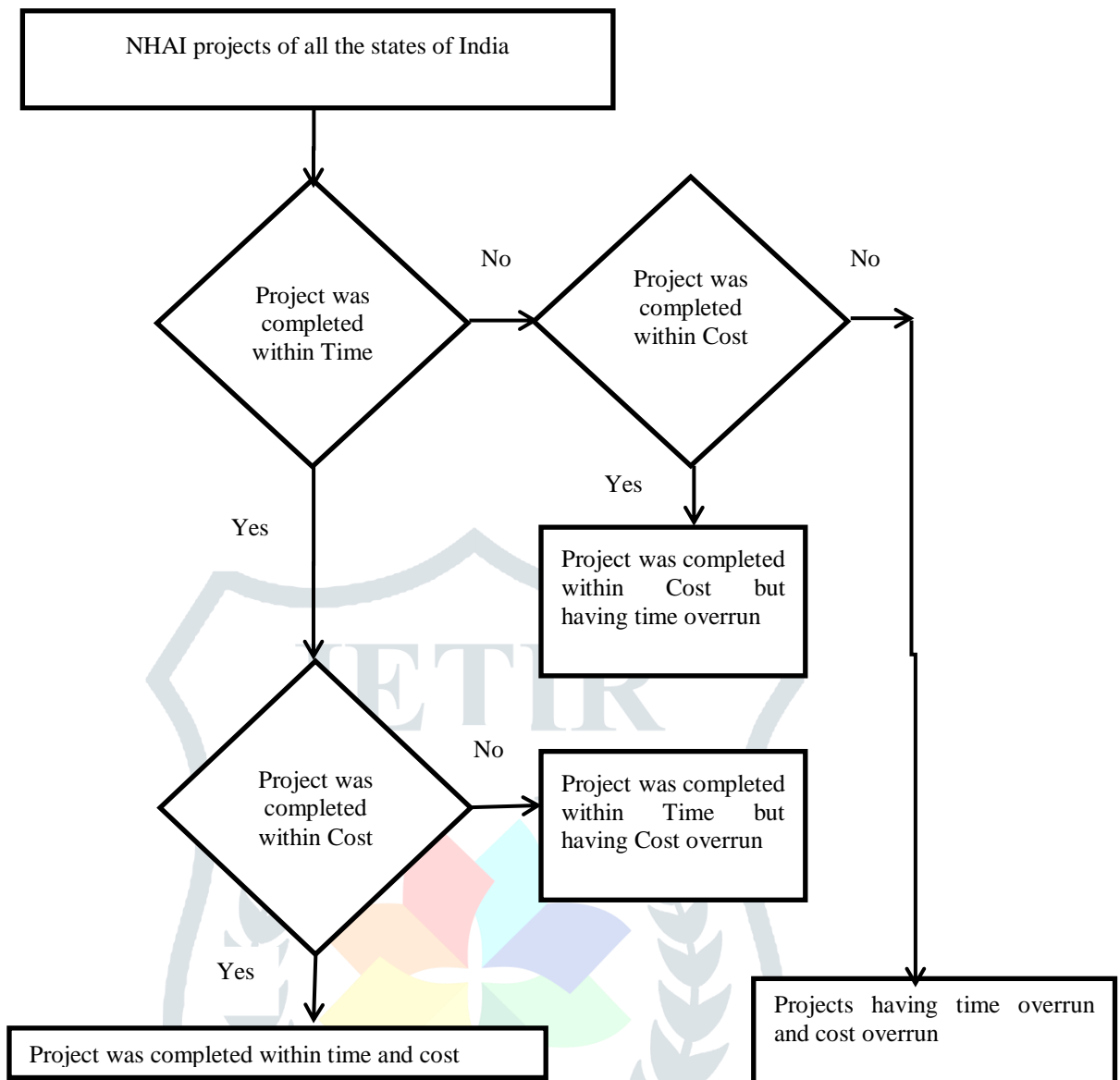


Figure 2 Methodology for Analysis
(Source: Compiled by author)

V. RESULT AND DISCUSSION

The result of 322 projects is given in Table I & II. Out of 322 projects, 120 projects were completed within time and budgeted cost, 88 projects reported more than budgeted cost called as cost overrun, and 114 projects were not completed within time, facing the problem of time overrun. This means only 37.26% of projects were completed within the time limit and budget. In this digital era, 27.32 percent of projects are over budget, while 27.32 percent of projects take longer than expected.

Table I summary analysis of NHAI projects

Sr.No.	Description	No of States & UT	Projects in Nos	Percentage
1	Projects having Time overrun	20	114	35.40%
2	Projects having cost overrun	20	88	27.32%
3	Project Completed within time and budget	25	120	37.26%
4	Projects having both time and cost overrun	16	61	18.94%

(Source: Compiled by author)

Only four states Delhi, Himachal Pradesh, Meghalaya, Uttarakhand does not have any time overrun as well as cost overrun while other state and Union territory facing problem either time overrun or cost overrun. as per status 2019. Data were further analyzed based on figure 2 and found that 61 projects with 16 states face both time and cost overruns it would be shown in table II.

Table II Statewise summary of NHAI projects details with different models

State wise no of projects having time overrun and costoverrun															
Sr. No	State	Built operate Transfer (BOT)		Built operate Transfer (BOT) Annuity		Built operate Transfer (BOT) Tall		Design - Build-Financ e- Operat e- Transf er(DB FOT)		Design - Build-Financ e- Operat e- Transf er(DB FOT) Tall		Management Contract (O&M)		Total	
		TO	CO	TO	CO	TO	CO	T	C	T	C	T	CO	TO	CO
1	Andhra Pradesh	2	2	4	4									6	6
2	Bihar									1	1			1	1
3	Gujarat	1	1					2	2					3	3
4	Jammu & Kashmir			1	1									1	1
5	Jharkhand	1	1											1	1
6	Karnataka	2	2	1	1	2	2			2	2			7	7
7	Kerala	2	2											2	2
8	Mahatastra	2	2					2	2					4	4
9	Multi state/centre	1	1			3	3			1	1			5	5
10	Odisha									1	1			1	1

11	Punjab			1	1	1	1						2	2	
12	Rajasthan	2	2			3	3	1	1				6	6	
13	Tamilnadu	9	9			1	1				1	1	11	11	
14	Telangana	2	2										2	2	
15	Uttarpradesh	1	1	2	2	1	1			1	1		5	5	
16	West Bengal	2	2	1	1							1	1	4	4
Total		27	27	10	10	11	11	5	5	6	6	2	2	61	61

(Source: [https://www.pppindia.gov.in/infrastructureindia/projectlist?id=1&searchType=Government Infrastructure Projects \(PPP\)](https://www.pppindia.gov.in/infrastructureindia/projectlist?id=1&searchType=Government Infrastructure Projects (PPP))))

The data were further analyzed as per the financial model. The highest time overruns and cost overruns 27nos of projects were found in the Built-Operate-Transfer BOT model and only two no of projects were found in the operation and maintenance contracts

The different state-wise and model-wise charts were prepared with different colour codes for easy visualization. Tamilnadu state is having the highest 11 projects facing problems of both time as well as cost overrun with different models. While Bihar, Jammu & Kashmir, Jharkhand, Odisha were having least 1 project facing a problem of time and cost overrun. As shown in Figure 3

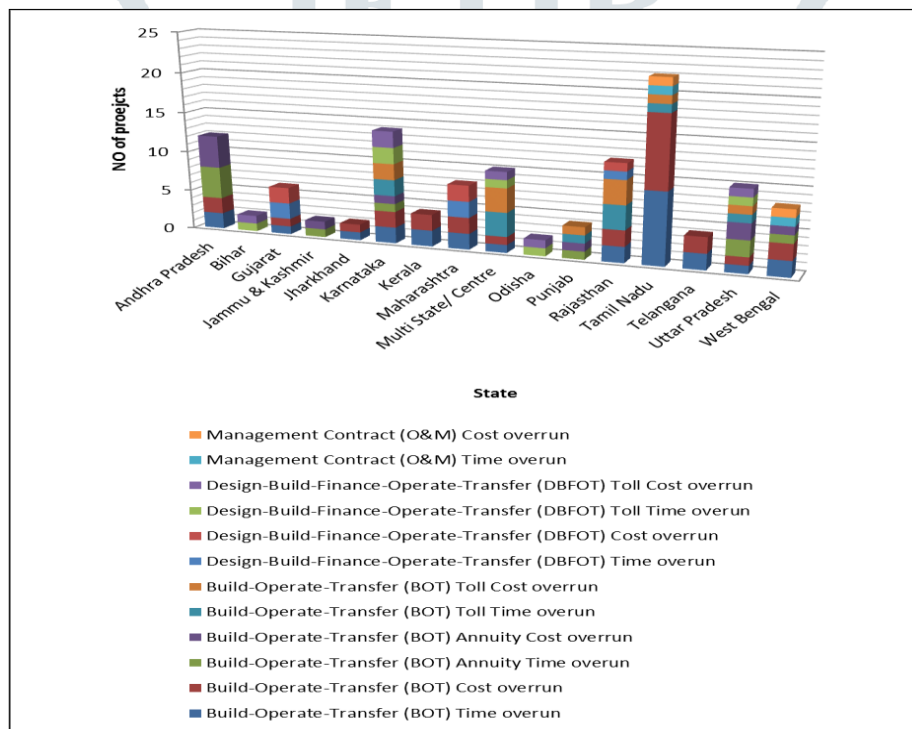


Figure 3 State wise, model wise Time overrun & cost overrun
(Source: Compiled by author)

Most of the states have problems with time overrun as well as cost overrun with different models. Each model is having its own uniqueness. One model is suitable for one project it cannot be suitable for other projects however it would be for the same state.

VI. CONCLUSION

National Highway projects in India face a significant amounts of time overrun and cost overrun. Based on an analysis of 322 NHAI projects more than 63% of projects have problems of time overrun or cost overrun or both. Only 37.26% of projects were completed within time and cost. Based on the above analysis most of the states with different models, have time and cost overrun, and no model is idle in this digital era. There are critical conditions for projects and lots of projects face problems of time and cost overrun. NHAI faces this problem in the majority of states in India with all types of different models. It is high time to do a

serious investigation into the problem of Time overrun and cost overrun of NHAI projects and find the root cause of the issue in this digitization era.

VII. FUTURE SCOPE

1) Effect of Time overrun and cost overrun in the different contractual models for other sectors of construction

2) Root cause of time overrun and cost overrun in the pre-construction stage and post construction stage.

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