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ASSESSMENT OF NATIONAL HIGHWAYS AUTHORITY OF INDIA [NHAI] PROJECTS BASED ON SELECTED FINANCIAL PARAMETERS

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Abstract: Overall, the objective of the dissertation was to conduct financial assessment of the sample of 61 national highway project based on the project characteristics. The regression analysis result suggests that capital expenditure and tollable length of the highway project significantly influenced the toll rates. Further, for each sample project, the project internal rate of return, payback period and discounted payback period was estimated based on project specific information available. Further, the sensitivity of these financial parameters with change in key project variables (i.e. toll rates and traffic intensity) was also investigated.

Index Terms - Payback period, Capital, traffic density, Toll rates, Design Capacity, Toll Plazas

I. INTRODUCTION

1.1 Toll Collection System

India has the second largest road network in the world and more than 90% of total passengers in India prefer roads for travelling. Roads are one of the important parameters, when it comes to measuring the economic growth of a country. It not only connects two different cities/states but also it is a crucial part of supply chain and logistics. Building world class roads for uninterrupted ride requires a lot of investment, which is a challenge for government. To overcome this, roads in India are built in public private partnership, as they are usually termed as, Build Operate Transfer (BOT) projects. Where private companies build roads, operates the road via collecting toll tax from public in return of using that road, and after recovery of the capital invested; it transfers it to the government. This process is called **"TOLL COLLECTION SYSTEM"**.

National Highways Authority of India (NHAI) is a government agency founded in 1988 by an act of parliament, and since then is working as an autonomous body that functions independently. It is a part of Ministry of Road Transport & Highways; and is responsible for the development, maintenance and management of over 50,000 km of national highways out of 1,15,000 km in India.



1.2 Toll Collection Methods in India

1.2.1 Conventional Toll Collection System

In conventional method, toll collection is done manually, where vehicles are stopped at toll booths to pay toll charges collected by an attendant and only after the payment the gateway is opened. There is a major disadvantage of this method, it is very time consuming and results in heavy traffic jams and wastage of fuel. Managing so much cash and giving change in return is also a challenge. The ticket given at toll is for single journey or two-way (single and return).

1.2.2 Automatic Electronic Toll Collection System

It is an automatic and convenient way, in which there is no need to stop the car for collecting toll charges. There is a radio frequency transponder device (bar code label) attached on the vehicle. When a vehicle passes, toll reader device sends radio signals, matches and transmits back and debits from the accounts of registered car owners. Electronic method is better than manual as there are no delays, traffic jams and saves driving time.

Radio Frequency Identification (RFID) system has two parts tag and reader. Tag has a specific sequence, to decode this information twoway interrogator (transmitter-receiver) emits signal. The tag reacts with the data composed in its memory bank. The interrogator will then transmit it to a computer.



1.3. Background of Study:

Globally, in the year 2018, India was ranked 44 in logistic performance index (LPI) by the world bank which includes the parameters covering customs, infrastructure, international shipment, logistic competence, tracking and tracing and timeliness (source: World Bank). To improve the competitiveness of logistic sector in India. In India, Government of India has been introducing various reforms. To improve the efficiency in the collection and management of tool, the government has introduced RFID based toll collection system, which will replace the existing predominantly cash based toll collection system. The new system has been introduced with effect from October 2019. This is likely to bring efficiency in the collection and management of tolls in India.

The existing system of determining the toll rates are inadequate and lack transparency from the perspective of the commuters. In publicprivate partnership (PPP model), the contract between government agencies (NHAI) and private company may take various forms, Build-Own-Transfer (BOT) has been dominant in construction of NHAI projects. This type of contract allows the private construction company (private party) to recover a prespecified rate of return (IRR) through collection of toll for a specified period after the construction of highway/commercial operation (a proportion of revenue is shared with NHAI i.e. revenue sharing model) and before the transfer of assets to the Government. Hence, various factors are considered to determine the toll rate. Among those factors are the projected cost of the project (capital expenditure), historical evidence with similar projects, project characteristics, expected traffic intensity, toll collectable length and the expected tenure/rights for toll collection are significant factors.

This study mainly focuses on assessment of toll rates across the country and what are the deciding factors to fix toll prices for a given toll plaza. Specifically, the study investigates the following research questions. First, is there any relationship or dependability of toll rates with the capital invested to build that toll? Second, what is the role of project specific parameters like traffic intensity, tollable length and design capacity of a toll plaza on fixation of toll rates. *Third*, how variability in specific project parameters influence the financial feasibility of the project measured in terms of payback period and discounted payback period.

II. LITERATURE REVIEW

Various studies in past have been undertaken on "Toll Road System in India". Most of these studies focus on different types of toll collecting methods, and their comparative analysis in order to find out which is the most feasible option out of all the options available. One such paper was published by Bharvi Joshi and her team in 2017. This paper focuses on comparison between conventional toll

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collection method and some automatic toll collection methods such as RFID, Fastag and Book my toll [Mobile Application to pay toll], where automatic methods like Fastag comes out to be better than the conventional ways. As these are less time consuming, reduces fuel wastage, no traffic jams and less processing time during payment.

Nagarjuna Pilaka (2018) assessed the performance of toll road system based on the sample of Pune region of India. The region comprised of major toll roads in and around Pune region. The toll plazas are set up by the private players for collecting toll from the vehicles passing through the road as portion of the contract agreement made with the Government. Most of the users felt that roads within the study region were not upto the required operational measures and the contractors never followed stipulated norms, as laid down within the roadway Operation & Maintenance contract. The citizens were unwilling to pay the toll expenses for the roads whereas the administrators increased the cost and were not taking any steps to decrease travel time. This Study was utilized for gathering the information on user satisfaction parameters because it may be a way of evaluating the system performances in terms of user benefit quality; and bringing transparency in the system. Primary data was collected through questionnaire survey, based on the sample data of 336 passengers across all six roads, covering various types of vehicles. The study utilized analysis of variance method (ANOVA), hypothesis testing and factor analysis to assess and validate this perception that the road users of this region has low level of satisfaction. The findings suggested that Pune-Ahmedabad road was found to be more efficient performance wise based on selected parameters, whereas Pune-Satara road was the worst performing among all six roads.

So, most of the studies in past have primarily focused on performance assessment of toll roads and to find better toll collection system in India, to reduce traffic jams and waiting time. But in this study we will talk about the escalation and increment in toll rates by the Government is justified or not, factors affecting toll rates and how much time does it take to recover back the money that is been invested in the project.

III. OBJECTIVES OF THE STUDY

The overall objective of the dissertation is to analyze the various aspects of NHAI projects based on the sample of selected NHAI projects. Further the study also explores the predictors of toll charges based on the sample data. The specific research objectives of the study are as follows:

- I. To investigate the association of toll rates with capital investment, traffic (PCU/Day), tollable length and design capacity, based on the sample of NHAI projects.
- II. To find out payback period (recovery time) in which the capital invested to build toll plazas is recovered. The sub-objectives were:
 - (a) To investigate the internal rate of return (IRR) from the project based on the assumptions taken with respect to project.
 - (b) To investigate the payback period for the project based on the assumptions taken with respect to project.
 - (c) To investigate the discounted payback period based on the assumptions taken with respect to project.
 - (d) To investigate the sensitivity of the project payback period with changes in the toll rates.
 - (e) To investigate the sensitivity of the project payback period with changes in traffic intensity.

IV. RESEARCH METHODOLOGY

4.1 Research objective:

i)

To investigate the association of toll rates with capital investment, traffic (PCU/Day), tollable length and design capacity, based on the sample of NHAI projects.

Data Source Sample Size and Methods:

The data related to key variables were collected from the official website of NHAI (http://tis.nhai.gov.in/tollplazasataglance) and other publicly available source. Out of data of 500 tolls available, a sample data of 61 toll projects were taken for which the variables specific data were available. The key variables included in the study are as follows:-

Table 1: Descrip	otion of variable
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Variable	Description
Toll rate (V1)	Toll rate charged for PCU and single journey in ₹)
Capital Expenditure (V2)	The total capital expenditure incurred in the construction of the span of highway (as per the project term) (in \mathfrak{X})

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Tollable length (V3)	in Kilo Meter
Design Capacity (PCU) (V4)	Maximum number of passenger car unit accommodated in per unit time
Traffic (PCU/day) (V5)	Measured in terms of passenger car unit per day

Hypothesized Model:

Toll rate (V1) = f(V2, V3, V4.V5) ------(1)

Statistical Method applied: Multiple regression analysis was used using IBM SPSS 20.0

ii) To find out payback period (recovery time) in which the capital invested to build toll plazas is recovered. The sub-objectives were:

- (f) To investigate the internal rate of return (IRR) from the project based on the assumptions taken with respect to project.
- (g) To investigate the payback period for the project based on the assumptions taken with respect to project.
- (h) To investigate the discounted payback period based on the assumptions taken with respect to project.
- (i) To investigate the sensitivity of the project payback period with changes in the toll rates.
- (j) To investigate the sensitivity of the project payback period with changes in traffic intensity.

Key assumptions:

- Risk free rate of interest was assumed to be annual rate of interest on fixed deposit with 10-year maturity (State Bank of (i) India) = 3.70 %
- Risk Premium (Market Rate of Return minus Risk Free Rate of Return) = 5% (ii)
- (iii) Each of the project were assumed to have similar risk characteristics and hence having similar hurdle rate of return for each project (i.e. risk-free rate + risk premium = 8.7%)
- Number of working days were assumed to be 365 days. (iv)
- The proportion of revenue sharing with NHAI was assumed to be 5 % (based on the evidence from the annual report of (v) sample construction companies)
- (vi) Operating and maintenance expense was assumed to be 10 % of the proportion of revenue (without adjustment for depreciation).
- Expected life of each project was assumed to be 50 years. (vii)
- (viii) Corporate tax rate was assumed to be 25 %.

Steps involved:

- (i) The annual income arising out of toll collection was estimated as given below: Annual income arising out of toll collection = Expected traffic per day X number of days X toll charge per vehicle (in ₹ per PCU per journey)
- (ii) Next, annual income was adjusted for the share of revenue with NHAI. Net income arising out of toll collection = Annual income arising out of toll collection minus revenue share with NHAI (based on revenue sharing agreement)
- (iii) Estimation of Earning Before Interest and Tax (EBIT) EBIT = Net Income arising out of toll collection – (operating and maintenance expenses + depreciation)
- Estimation of annual cash inflow from the project (iv) Annual cash inflow from the project = EBIT (1 - Tax rate) + Depreciation
- Estimation of project Internal Rate of Return (Project IRR is the discount rate at which the present value (PV) of cash (v) outflow (i.e. project capital investment) will become equal to present value of cash inflow as shown in equation 2 Project Capital Investment = $\sum_{i=1}^{i=50} CFi/(1+k)^{i}$ -----(2) Where k = Internal rate of return (IRR)
- (vi) Estimation of project payback period Project payback period is the period (in years) in which the project will be able to recover its investments (i.e. project capital investment)
- Estimation of project discounted payback period (vii) Project discounted payback discounts the future cash flow at the hurdle rate/ required IRR to estimate the period in which the project will be able to recover its investments (i.e. project capital investment).
- Sensitivity analysis was conducted to assess the sensitivity of payback period and discounted payback period with (viii) (i) changes/increase in the annual toll rate under various scenarios and
 - (ii) changes in traffic density under various scenarios.

V. DATA INTERPRETATION AND ANALYSIS

Results of Regression Analysis

REGRESSION OUTPUT:

Descriptive Statistics

	Mean	Std. Deviation	Ν
Toll_Rate	72.1639	31.12190	61
Project Capital Investment	607.3462	564.36250	61
Tollable_Length	50.3803	23.98627	61
Design_Capacity	47783.0164	36892.52674	61
Traffic	126332.4918	317524.99932	61

Model Summary

					Change Statistics					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	
1	.659 ^a	.434	.394	24.22830	.434	10.750	4	56	.000	

a. Predictors: (Constant), Traffic, Design_Capacity, Tollable_Length, Capital

- From the output table we can see the summary of regression model. Values of R² is .434 with adjusted R² = .394, meaning linear regression explains 39.4% of the variance in the data.
- R-Square: This shows the amount of variance of the dependent variable (which is toll rate) explained by the independent variable (here, capital, tollable length, traffic, design capacity). In this research, the model explains 39.4% of the variance in sales.

ANOVA:

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	25241.774	4	6310.443	10.750	.000 ^b
	Residual	32872.587	56	587.010		
	Total	58114.361	60			

a. Dependent Variable: Toll_Rate

b. Predictors: (Constant), Traffic, Design_Capacity, Tollable_Length, Capital

COEFFICIENTS:

		Unstandardized Coefficients		Standardized Coefficients		
Model		В	Std. Error	Beta	Т	Sig.
1	(Constant)	28.036	9.048		3.099	.003
	Project Capital Investment	.020	.006	.363	3.183	.002
	Tollable_Length	.705	.136	.543	5.183	.000
	Design_Capacity	-3.547E-5	.000	042	388	.699
	Traffic	-1.452E-5	.000	148	-1.363	.178

a. Dependent Variable: Toll Rate

The findings of regression analysis suggest that (i) overall model was significant (F=10.750,p<.05), (ii) project capital investment (β =0.543, p<.05) and tollable length (β = 0.363, p<.05) significantly positively influenced the toll rate. Further, design capacity and traffic intensity did not significantly influence the toll rate for the sample company.

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Overall, the regression model was

 $Toll rate = 28.036 + (.020) Project Capital Investment + (.705) Tollable_Length - (3.547 X 10^{-5}) Design Capacity - (1.45X 10^{-5}) Traffic Intensity.$

For estimation of payback period and discounted payback period for the sample projects:

|--|

Project Name: NH-16 (Aganampudi)Project Capital Investment (in ₹ crores): 63.54Tollable Length (in KM): 40.707Expected Traffic per Day (in PCU/Day): 52033Toll charges per vehicle (in ₹/ PCU per Journey): 50Design Capacity (in PCU): 40,000Sensitivity Analysis with Changes in Key VariablesSensitivity of the project with annual increase in toll rateSensitivity of

Sensitivity of the project with annual increase in traffic

	Base toll rate (in ₹ per vehicle)	annual increase(2%)	annual increase(5%)	annual increase(10%)	e ^{ala} a	Expected Traffic per Day (in PCU/Day)	annual increase(2%)	annual increase(5%)	annual increase(10%)
Hurdle 🚿	al ^{ist}			L Star	Hurdle	1021.33	88		
Rate	8.70%	8.70%	8.70%	8.70%	Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback					Payback			11	
Period (in	2	2	2	2	Period (in	2	2	2	2
years)	2		2		years)	2		2	2
Discounted	Sec. 1				Discounted	1	3~		
Period (in	and the second	4		Car . Store	Period (in				
years)	2	2	2	2	years)	2	2	2	2
Internal					Internal	Pillotana a con			
Rate of					Rate of				
Keturn (in %)	96%	98%	101%	106%	Keturn (in %)	96%	98%	101%	106%

Table 4: Snapshot of Project NH-16 financial performance analysis

Project Name: NH-5 (Bellupada)					
Project Capital Investment (in ₹ crores): 183.46					
Tollable Length (in KM): 57.454					
Expected Traffic per Day (in PCU/Day): 22649					
Toll charges per vehicle (in ₹/ PCU per Journey): 90					
Design Capacity (in PCU): 40000					
Sensitivity Analysis with Changes in Key Variables					
Sensitivity of the project with annual increase in toll rate	Sensitivity of the project with annual increase in traffic				

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	Base toll rate (in ₹ per vehicl	annual increase(2	annual increase(5	annual increase(10		Expecte d Traffic per Day (in PCU/Da	annual increase(2	annual increase(5	annual increase(10
	e)	%)	%)	%)		y)	%)	%)	%)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	4	4	4	4	Payback Period (in years)	4	4	4	4
Discount ed payback Period (in years)	5	5	5	5	Discounte d payback Period (in years)	5	5	5	5
Internal Rate of Return					Internal Rate of Return				
(in %)	27%	29%	32%	37%	(in %)	27%	28%	31%	36%
Table 5: Snapshot of Project NH-16 financial performance analysis Project Name: NH-16 (Chilakapalem) Project Capital Investment (in ₹ crores): 171.25 Tollable Length (in KM): 48 Expected Traffic per Day (in PCU/Day): 40928 Toll charges per vehicle (in ₹/ PCU per Journey): 45 Design Group in (in DCU)									
Sensitivity	Analysis	with Changes	in Key Variab	les					
Sensitivity	Base toll rate (in ₹ per vehicl e)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)	Sensitivity	Expecte d Traffic per Day (in PCU/Da y)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	4	4	4	4	Payback Period (in years)	4	4	4	4
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Discount ed payback Period (in years)	5	5	5	5	Discounte d payback Period (in years)	5	5	5	5	
Internal					Internal					
Rate of					Rate of					
Return					Return					
(in %)	26%	28%	31%	36%	(in %)	26%	28%	31%	36%	

Table 6: Snapshot of Project NH-16 financial performance analysis

Project Name: NH-16 (Eethakota)

Project Capital Investment (in ₹ crores): 716.71

Tollable Length (in KM): 48.53

Expected Traffic per Day (in PCU/Day): 25601

Toll charges per vehicle (in ₹/ PCU per Journey): 95

Design Ca	pacity (in	PCU):19877		2 mars		57/905			
Sensitivity	Analysis	with Changes i	in Key <mark>Variabl</mark>	es	Sensitivity	Analysis wit	th Changes in l	Key Variables	
Sensitivity	of the pro	ject with annu	al incr <mark>ease in t</mark>	oll rate	Sensitivity	of the project	ct with annual i	ncrease in traf	fic
4	Base toll rate (in ₹ per vehicl e)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)		Expecte d Traffic per Day (in PCU/Da y)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)
Hurdle Rate	<mark>8</mark> .70%	8.70%	<mark>8</mark> .70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	12	11	10	9	Payback Period (in years)	12	11	10	9
Discount ed payback Period (in years)	NA	25	17	13	Discounte d payback Period (in years)	NA	26	18	13
Internal Rate of Return (in %)	8%	10%	13%	18%	Internal Rate of Return (in %)	8%	10%	13%	18%

Table 7: Snapshot of Project NH-16 financial performance analysis

Project Name: NH-16 (Kaza)

Project Capital Investment (in ₹ crores): 675

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Tollable Length (in KM): 82.5

Expected Traffic per Day (in PCU/Day): 64209

Toll charges per vehicle (in ₹/ PCU per Journey): 90

Design Capacity (in PCU):90000

Sensitivity	Analysis	with Changes	in Key Variabl	es					
Sensitivity	of the pro	ject with annu	al increase in t	oll rate	Sensitivity	of the projec	ct with annual i	increase in traf	fic
	Base toll rate (in ₹ per vehicl e)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)		Expecte d Traffic per Day (in PCU/Da y)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	5	5	6	5	Payback Period (in years)	5.	5	5	5
Discount ed payback Period (in years)	7	7	5	6	Discounte d payback Period (in years)	7	7	6	6
Internal Rate of Return (in %)	21%	23%	26%	31%	Internal Rate of Return (in %)	21%	22%	25%	30%

Table 8: Snapshot of Project NH-16 financial performance analysis

Project Name: NH-16 (Krishnavaram)

Project Capital Investment (in ₹ crores):431

Tollable Length (in KM): 71.27

Expected Traffic per Day (in PCU/Day): 39167

Toll charges per vehicle (in ₹/ PCU per Journey): 85

Design Capacity (in PCU):10763

Sensitivity Analysis with Changes in Key Variables

Sensitivity of the project with annual increase in toll rate

Sensitivity of the project with annual increase in traffic

	Base toll rate (in ₹ per vehicl e)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)		Expecte d Traffic per Day (in PCU/Da y)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50

Payback Period (in years)	6	6	5	5	Payback Period (in years)	6	6	5	5
Discount ed payback Period (in years)	8	8	7	6	Discounte d payback Period (in years)	8	8	7	6
Internal Rate of Return (in %)	19%	21%	24%	29%	Internal Rate of Return (in %)	19%	21%	23%	28%

Table 9: S	napshot o	of Project NH	-16 financial j	performance anal	ysis						
Project Na	me: NH-1	6 (Laxmipurar	n)								
Project Ca	pital Inves	stment (in ₹ cro	ores):229.39								
Tollable L	ength (in]	KM): 66.15									
Expected 7	Fraffic per	Day (in PCU/	Day): 18413			30					
Toll charge	es per veh	icle (in ₹/ PCU	J per Journey):	115							
Design Ca	pacity (in	PCU):40000									
Sensitivity	Analysis	with Changes	in Key <mark>Variab</mark> l	es			231	Sec.			
Sensitivity	of the pro	ject with annu	al incr <mark>ease in t</mark>	oll rate	Sensitivity of the project with annual increase in traffic						
	Base							N 8			
	toll					Expecte		1.1			
	rate					d Traffic	1	1			
	(in ₹	annual	annual	annual		per Day	annual	annual	annual		
	vehicl	increase(2	increase(5	increase(10		PCU/Da	increase(2	increase(5	increase(10		
	e)	%)	%)	%)		y)	%)	%)	%)		
Hurdle	14				Hurdle	/	1 V '	р.			
Rate	8.70%	8.70%	8.70%	8.70%	Rate	8.70%	8.70%	8.70%	8.70%		
Project		an an		The state	Project	Street.	P-				
Life	50	50	50	50	Life	50	50	50	50		
			1998 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -		200322-000						
Pavback					Pavback						
Period					Period (in						
(in years)	5	5	5	4	years)	5	5	5	4		
Discount											
ed payback					d payback						
Period					Period (in						
(in years)	6	6	6	5	years)	6	6	6	5		
Internal Bata of	napshot of Project NH-16 (Inancial performance analysis me: NH-16 (Laxmipuram) pital Investment (in ₹ crores):229.39 ength (in KM): 66.15 Fraffic per Day (in PCU/Day): 18413 se per vehicle (in ₹ PCU) per Journey): 115 pacity (in PCU):40000 Analysis with Changes in Key Variables of the project with annual increase in toll rate Base toll rate (in ₹ per annual increase(2) annual increase(2) increase(10 e) %) %) %) 8.70% 9.5 5 5 5 4 Discounte d payback Period (in years) 5 6 6 6 5 5 Discounte d payback Period (in years) 6 6 6 6 5										
Return					Return						
(in %)	22%	24%	27%	32%	(in %)	22%	24%	27%	32%		

Table 10: Snapshot of Project NH-16 financial performance analysis

Project Name:NH-16 (Madapam)

Project Capital Investment (in ₹ crores):248.18

Tollable Length (in KM): 63

Expected Traffic per Day (in PCU/Day): 32648

Toll charges per vehicle (in ₹/ PCU per Journey): 30

Design Capacity (in PCU):40000

Sensitivity Analysis with Changes in Key Variables					1 Shall and					
Sensitivity	of the pro	ject with annu	ual incr <mark>ease in t</mark>	coll rate	Sensitivity	of the project	ct with annual	increase in traf	ffic	
	Base toll rate (in ₹ per vehicl e)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)		Expecte d Traffic per Day (in PCU/Da y)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)	
Hurdle					Hurdle			and the second s		
Rate	8.70%	8.70%	8.70%	8.70%	Rate	8.70%	8.70%	8.70%	8.70%	
Project Life	50	50	50	50	Proj <mark>ect</mark> Life	50	50	50	50	
Payback Period (in years)	11	10	9	8	Payback Period (in years)	11	10	9	8	
Discount ed payback Period (in years)	27	19	14	11	Discounte d payback Period (in years)	27	19	15	11	
Internal Rate of Return (in %)	10%	12%	15%	20%	Internal Rate of Return (in %)	10%	12%	14%	19%	

Table 11: Snapshot of Project NH-16 financial performance analysis

Project Name:NH-5, Main Toll (Panchvati) Project Capital Investment (in ₹ crores):181.91 Tollable Length (in KM):10.336 Expected Traffic per Day (in PCU/Day): 34442

Toll charge	es per veh pooitu (in	nicle (in ₹/ PCU	J per Journey):	37					
Sensitivity	Analysis	with Changes	in Key Variah	les					
Sensitivity	of the pro-	oject with annu	al increase in	toll rate	Sensitivity	of the proje	ct with annual	increase in trat	ffic
	Base toll rate (in ₹ per vehicl e)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)		Expecte d Traffic per Day (in PCU/Da y)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period					Payback Period (in				
(in years)	6	6	6	5	years)	6	6	6	5
Discount ed payback	<u>e</u>			ALL P	Discounte d payback				
(in years)	9	8	8	7	years)	9	8	8	7
Internal Rate of Return					Internal Rate of Return				
(in %)	17%	19%	22%	27%	(in %)	17%	19%	22%	27%
Table 12:	Snapshot	t of Project NI	H-16 financia	I performance ar	nalysis	<	100		
Project Na	me:NH-1	6 (Nathavalasa	Vizianagarar	n)	NO. 112 INCOME				
Project Ca	pital Inve	stment (in ₹ cr KN0:46 24	ores):181.36						
Expected 7	Engin (m Fraffic pe	r Day (in PCU)	(Dav): 30896						
Toll charg	es per veh	icle (in ₹/ PCU	J per Journey):	50					
Design Ca	pacity (in	PCU):40000							
Sensitivity	Analysis	with Changes	in Key Variab	les					
Sensitivity	of the pro	oject with annu	al increase in	toll rate	Sensitivity	of the project	ct with annual	increase in trat	ffic
	Base toll rate (in ₹ per vehicl e)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)		Expecte d Traffic per Day (in PCU/Da y)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
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Payback Period (in years)	5	5	5	5	Payback Period (in years)	5	5	5	5
Discount ed payback Period (in years)	7	7	6	6	Discounte d payback Period (in years)	7	7	6	6
Internal Rate of Return (in %)	20%	22%	25%	30%	Internal Rate of Return (in %)	20%	22%	25%	30%

Table 13: Snapshot of Project NH-16 financial performance analysis

Table 15: 5	Snapsnot	of Project Nr	1-10 Imancial	performance ana	iysis				
Project Nat	me:NH-5	(Secondary To	oll (Go <mark>sthani G</mark> a	ate /Sheela Nagar)))				
Project Cap	oital Inves	stment (in ₹ cro	ores):1 <mark>81.91</mark>			Sec.			
Tollable Le	ength (in l	KM):10.336		and the second second		Street View			
Expected T	raffic per	Day (in PCU/	Day): <mark>34442</mark>						
Toll charge	es per veh	icle (in ₹/ PCU	^J per Jo <mark>urney):</mark>	37					
Design Cap	pacity (in	PCU):40000						Stern Real	
Sensitivity	Analysis	with Changes	in Key <mark>Variabl</mark>	es		- 1 B		2	
Sensitivity	of the pro	ject with annu	al incr <mark>ease in t</mark>	oll rate	Sensitivity	of the project	ct with annual i	ncrease in traf	fic
	Base toll rate (in ₹ per vehicl e)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)		Expecte d Traffic per Day (in PCU/Da y)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	6	6	6	5	Payback Period (in years)	6	6	6	5
Discount ed payback Period (in years)	9	8	8	7	Discounte d payback Period (in years)	9	8	8	7
Internal Rate of Return (in %)	17%	19%	22%	27%	Internal Rate of Return (in %)	17%	19%	22%	27%

Sensitivity of the project with annual increase in traffic

Table 14: Snap	pshot of Project NH-1	16 financial j	performance analysis

Project Name:NH-16 [Vempadu]

Project Capital Investment (in ₹ crores):234 Tollable Length (in KM):89.27

Expected Traffic per Day (in PCU/Day): 43363

Toll charges per vehicle (in ₹/ PCU per Journey): 110

Design Capacity (in PCU):40000

Sensitivity Analysis with Changes in Key Variables Sensitivity of the project with annual increase in toll rate

	Base toll rate (in ₹ per vehicl e)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)		Expecte d Traffic per Day (in PCU/Da y)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	3	3	3	2	Payback Period (in years)	3	3	3	2
Discount ed payback Period (in years)	3	3	3	3	Discounte d payback Period (in years)	3	3	3	3
Internal Rate of Return (in %)	48%	50%	53%	58%	Internal Rate of Return (in %)	48%	50%	53%	58%

Table 15: Snapshot of Project NH-16 financial performance analysis

Project Name:NH-31 [Barsoni] Project Capital Investment (in ₹ crores):384.36 Tollable Length (in KM):48.045 Expected Traffic per Day (in PCU/Day): 24970 Toll charges per vehicle (in ₹/ PCU per Journey): 55 Design Capacity (in PCU):40000

Sensitivity	Analysis	with Changes	in Key Variab	les					
Sensitivity	of the pro	oject with annu	al increase in	toll rate	Sensitivity	of the proje	ct with annual	increase in tra	ffic
	Base toll rate (in ₹ per vehicl e)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)		Expecte d Traffic per Day (in PCU/Da y)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	12	11	10	8	Payback Period (in years)	12	11	10	9
Discount ed payback Period	19	22	16		Discounte d payback Period (in	49	22	16	12
(in years) Internal Rate of Return	48	23	16	12	Internal Rate of Return	48	23	16	12
(in %)	9%	11%	14%	19%	(in %)	9%	11%	14%	18%
Table 16: Project Na Project Ca Tollable L Expected 7 Toll charge Design Ca	Snapshot me:NH-1 pital Inve: ength (in Fraffic per es per veh pacity (in	t of Project N 9 [Saukala] stment (in ₹ cr KM):60 r Day (in PCU, iicle (in ₹/ PCU PCU):40000	H-16 financia ores):431.74 /Day): 36368 J per Journey)	l performance an	nalysis		JO		
Sensitivity	Analysis	with Changes	in Key Variab	les		6.1		· · .	
Sensitivity	of the pro	oject with annu	al increase in	toll rate	Sensitivity	of the proje	ct with annual	increase in tra	ffic
	Base toll rate (in ₹ per vehicl e)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)		Expecte d Traffic per Day (in PCU/Da y)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50

Payback Period (in years)	6	6	6	5	Payback Period (in years)	6	6	6	5
Discount ed payback Period (in years)	9	8	7	7	Discounte d payback Period (in years)	9	8	7	7
Internal Rate of Return (in %)	17%	19%	22%	27%	Internal Rate of Return (in %)	17%	19%	22%	27%

Table 17: Snapshot of Project NH-16 financial performance analysis

Table 17: S	Snapshot	of Project NH	l-16 financial	performance ana	lysis	and the second			
Project Nar	ne:NH-6	(Durg Bypass))						
Project Cap	oital Inves	tment (in ₹ cro	ores):123						
Tollable Le	ength (in F	KM):18							
Expected T	raffic per	Day (in PCU/	Day): 2 <mark>0742</mark>					S 8.	
Toll charge	s per vehi	icle (in ₹/ PCU	per Journey):	60				1 0	
Design Cap	oacity (in]	PCU):15000			11	· · · ·		1-1	
Sensitivity	Analysis •	with Changes i	n Key Variabl	es		-	- /	and the second s	
Sensitivity	of the pro	ject with annu	al increase in to	oll rate	Sensitivity of	of the projec	<mark>t with annual</mark> i	increase in traf	fic
	Base toll rate (in ₹ per vehicl e)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)		Expecte d Traffic per Day (in PCU/Da y)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	5	5	4	4	Payback Period (in years)	5	5	4	4
Discount ed payback Period (in years)	6	6	5	5	Discounte d payback Period (in years)	6	6	5	5
Internal Rate of Return	2.40/	2.694	2004	0.404	Internal Rate of Return	2.10/	2.69/	2004	2.497
(in %)	24%	26%	29%	34%	(in %)	24%	26%	29%	34%
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Table 18: Snapshot of Project NH-16 financial performance analysis

Project Name:NH-6, old 53(Kharun, MoRTH) Project Capital Investment (in ₹ crores):123 Tollable Length (in KM):82 Expected Traffic per Day (in PCU/Day): 10251 Toll charges per vehicle (in ₹/ PCU per Journey): 24 Design Capacity (in

PCU):22103

Sensitivity Analysis with Changes in Key Variables Sensitivity of the project with annual increase in toll rate Sensitivity of the project with annual increase in traffic Base Expecte toll d Traffic rate (in ₹ per Day annual annual annual annual annual annual per (in increase(2 increase(5 increase(10 PCU/Da increase(2 increase(5 increase(10 vehicl e) %) %) %) %) %) %) y) Hurdle Hurdle Rate 8.70% 8.70% 8.70% 8.70% Rate 8.70% 8.70% 8.70% 8.70% Project Project 50 50 50 Life 50 50 Life 50 50 50 Payback Payback Period Period (in (in years) 14 12 11 years) 14 12 11 10 Discount Discount ed ed payback payback Period Period (in (in years) NA 35 20 14 years) NA 21 14 Internal Internal Rate of Rate of Return Return 7% 9% 12% 17% 7% 9% 12% 17% (in %) (in %)

Table 19: Snapshot of Project NH-16 financial performance analysis

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Project Name:NH-48 Project Capital Investment (in ₹ crores):555 Tollable Length (in KM):27.7 Expected Traffic per Day (in PCU/Day): 94559 Toll charges per vehicle (in ₹/ PCU per Journey): 65 Design Capacity (in PCU):180000 Sensitivity Analysis with Changes in Key Variables Sensitivity of the project with annual increase in toll rate Sensitivity of the project with annual increase in traffic Base Expecte toll rate d Traffic (in ₹ per Day per annual annual annual (in annual annual annual vehicle increase(2 increase(5 increase(10 PCU/Da increase(2 increase(5 increase(10

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Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	4	4	4	4	Payback Period (in years)	4	4	4	4
Discounte d payback Period (in years)	5	5	5	5	Discounte d payback Period (in years)	5	5	5	5
Internal Rate of Return (in %)	26%	28%	31%	36%	Internal Rate of Return (in %)	26%	28%	31%	36%

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Project Name:NH-59 (bhatwada)

Project Capital Investment (in ₹ crores):750

Tollable Length (in KM):87.102

Expected Traffic per Day (in PCU/Day): 17736

Toll charges per vehicle (in ₹/ PCU per Journey): 140

Design Capacity (in PCU):60000

Sensitivity Analysis with Changes in Key Variables

Sensitivity of the project with annual increase in toll rate

Sensitivity of the project with annual increase in traffic

	Base toll rate			and the state of the	\subseteq	Expecte d Traffic	13		
	(ın ₹ per vehicl e)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)		per Day (in PCU/Da y)	annual increase(2 %)	annual increase(5%)	annual increase(10 %)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	13	11	10	9	Payback Period (in years)	13	12	10	9
Discount ed payback Period (in years)	NA	27	18	13	Discounte d payback Period (in years)	NA	27	18	13

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Internal					Internal					
Rate of					Rate of					
Return					Return					
(in %)	8%	10%	13%	18%	(in %)	8%	10%	13%	18%	

Table 21:	Snapshot	of Project NI	I-16 financial	performance ana	lysis				
Project Na	me:NH-8	(boriach)							
Project Ca	pital Inves	stment (in ₹ cro	ores):2528.57						
Tollable L	ength (in l	KM):55.2							
Expected 7	Fraffic per	Day (in PCU/	Day): 268219						
Toll charg	es per veh	icle (in ₹/ PCU	per Journey):	60					
Design Ca	pacity (in	PCU):90000							
Sensitivity	Analysis	with Changes	in Key Variabl	es					
Sensitivity	of the pro	ject with annu	al increase in t	oll rate	Sensitivity	of the proje	ct with annual	increase in trat	ffic
	Base toll rate (in ₹ per vehicl e)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)	6	Expecte d Traffic per Day (in PCU/Da y)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)
Hurdle Rate	8.70%	8.70%	8.70 <mark>%</mark>	8.70%	Hurdle Rate	8.70%	8.70%	<mark>8.</mark> 70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	7	7 3	6	6	Payback Period (in years)	7	30	6	6
Discount ed payback Period (in years)	10	9	8	7	Discounte d payback Period (in years)	10	10	8	7
Internal Rate of Return (in %)	15%	17%	20%	25%	Internal Rate of Return (in %)	15%	17%	20%	25%

Table 22: Snapshot of Project NH-16 financial performance analysis

Project Name:NH-8 (choryasi) Project Capital Investment (in ₹ crores):1405.49 Tollable Length (in KM):65 Expected Traffic per Day (in PCU/Day): 119377 Toll charges per vehicle (in ₹/ PCU per Journey): 75 Design Capacity (in PCU):70000

Sensitivity	Analysis	with Changes	in Key Variabl	es					
Sensitivity	of the pro	ject with annu	al increase in t	oll rate	Sensitivity	of the projec	ct with annual	increase in traf	fic
	Base toll rate (in ₹ per vehicl e)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)		Expecte d Traffic per Day (in PCU/Da y)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	7	7	6	6	Payback Period (in years)	7	7	б	б
Discount ed payback Period (in years)	10	9	8	7	Discounte d payback Period (in years)	10	9	8	7
Internal Rate of Return (in %)	15%	17%	20%	25%	Internal Rate of Return (in %)	15%	17%	20%	25%
Table 23:	Snapshot	of Project NI	I-16 financial	performance ana	llysis	2		3	
Project Nat Project Cap Tollable La Expected T Toll charge	me:NH-27 pital Inves ength (in I Fraffic per es per veh	7 (Old 8B) stment (in ₹ cro KM):65.1 Day (in PCU/ icle (in ₹/ PCU	Dres):421.01 Day): 107964 J per Journey):	95		~	20.		
Design Ca	pacity (in	PCU):4			1. Alexandre				
Sensitivity	Analysis of the pro	with Changes oject with annu	in Key Variabl al increase in t	oll rate	Sensitivity	of the projec	ct with annual	increase in traf	ffic
	Base toll rate (in ₹ per vehicl e)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)		Expecte d Traffic per Day (in PCU/Da y)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	2 CRT2005	2 5302 Inter	2 national Jou	2 rnal of Creative	Payback Period (in years) Research T	2 houghts (I	2 JJCRT) <u>w</u> ww	2 .ijcrt.org	2 2275

Discount ed payback Period (in years)	2	2	2	2	Discounte d payback Period (in years)	2	2	2	2
Internal					Internal				
Rate of					Rate of				
Return					Return				
(in %)	58%	60%	63%	68%	(in %)	58%	60%	62%	67%

Table 24: Snapshot of Project NH-16 financial performance analysis

Project Capital Investment (in ₹ crores):435.81

Tollable Length (in KM):71.253

Expected Traffic per Day (in PCU/Day): 137990

Toll charges per vehicle (in ₹/ PCU per Journey): 90

Design Capacity (in PCU):4

Sensitivity Analysis with Changes in Key Variables

Sensitivity of the project with annual increase in toll rate

Sensitivity of the project with annual increase in traffic

į	Base toll rate (in ₹ per vehicl e)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)	3	Expecte d Traffic per Day (in PCU/Da y)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	2	2	2	2	Payback Period (in years)	2	2	2	2
Discount ed payback Period (in years)	2	2	2	2	Discounte d payback Period (in years)	2	2	2	2

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Internal					Internal					
Rate of					Rate of					
111110 01					1000 01					
Return					Return					
notum					notum					
(in %)	67%	69%	72%	77%	(in %)	67%	69%	72%	77%	
(/ * /			/ \$		 (/ * /		0, 10	,_,.		

Table 25:	Snapshot	of Project NI	H-16 financia	l performance ana	alysis				
Project Na	me:NH-8	B [Vanana]							
Project Ca	pital Inves	stment (in ₹ cr	ores):272.44						
Tollable L	ength (in]	KM):51.46							
Expected 7	Traffic per	Day (in PCU/	Day): 91820						
Toll charg	es per veh	icle (in ₹/ PCU	J per Journey):	65					
Design Ca	pacity (in	PCU):4							
Sensitivity	Analysis	with Changes	in Key Variabl	les					
Sensitivity	of the pro	ject with annu	al increase in t	oll rate	Sensitivity	of the proje	ct with annual	increase in traf	fic
	Base toll rate (in ₹ per vehicl	annual increase(2	annual increase(5	annual increase(10		Expecte d Traffic per Day (in PCU/Da	annual increase(2	annual increase(5	annual increase(10
	e)	%)	%)	%)	-	y)	%)	%)	%)
Hurdle Rate	8.70%	8.70%	8.70 <mark>%</mark>	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	2	2	2	2	Payback Period (in years)	2	2 (1	2	2
Discount ed payback Period (in years)	3	2	3	3	Discounte d payback Period (in years)	3	2	3	3
Internal Rate of Return (in %)	52%	54%	57%	62%	Internal Rate of Return (in %)	52%	54%	57%	62%

Table 26: Snapshot of Project NH-16 financial performance analysis

Project Name:NH-71 Project Capital Investment (in ₹ crores):650 Tollable Length (in KM):44.875 Expected Traffic per Day (in PCU/Day): 28119 Toll charges per vehicle (in ₹/ PCU per Journey): 75 Design Capacity (in PCU):30000 Sensitivity Analysis with Changes in Key Variables Sensitivity of the project with annual increase in toll rate

Sensitivity of the project with annual increase in traffic

	Base toll rate (in ₹ per vehicle)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)		Expecte d Traffic per Day (in PCU/Da y)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	14	12	11	9	Payback Period (in years)	13	12	10	9
Discounte d payback Period (in	NA	35	20	13	Discounte d payback Period (in years)	NA	29	19	13
Internal Rate of Return	NA	35	20	15	Internal Rate of Return		27		15
(in %)	7%	9%	12	18%	(in %)	8%	10%	13%	18%
Table 27: SProject Nan01)Project CapTollable LeExpected TrToll chargesDesign CapSensitivity J	Snapshot C ne:NH-44(ital Investr ngth (in K raffic per I s per vehic acity (in P Analysis w	of Project NH Old NH ment (in ₹ cro M):110.00 Day (in PCU/I ele (in ₹/ PCU CU):30000 vith Changes in	-16 financial res):2747.5 Day): 71779 per Journey): 1	performance and 25	alysis		JCP		
Sensitivity	of the proj	ect with annua	l increase in to	ll rate	Sensitivity of	of the projec	t with annual i	ncrease in traf	fic
	Base toll rate (in ₹ per vehicl e)_	annual increase(2 %)	annual increase(5 %)_	annual increase(10 %)		Expecte d Traffic per Day (in PCU/Da y)_	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50

Payback Period (in years)	13	12	10	9	Payback Period (in years)	13	12	10	9
Discount ed payback Period (in years)	NA	28	18	13	Discounte d payback Period (in years)	NA	28	18	13
Internal Rate of Return (in %)	8%	10%	13%	18%	Internal Rate of Return (in %)	8%	10%	13%	18%

Table 28: Snapshot of Project NH-16 financial performance analysis

Project Name:NH-	Par from	
71Å		
Project Capital Investment (in ₹ crores):8 <mark>07</mark>		
Tollable Length (in KM):41.53		
Expected Traffic per Day (in PCU/Day): 24071		
Toll charges per vehicle (in ₹/ PCU per Journey): 130		
Design Capacity (in PCU):60000		
Sensitivity Analysis with Changes in Key Variables	1.00	

Sensitivity of the project with annual increase in toll rate

Sensitivity of the project with annual increase in traffic

	Base toll rate (in ₹ per vehicle)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)	9	Expecte d Traffic per Day (in PCU/Da y)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)
Hurdle	0.700/	9.70%	0.700/	0.700/	Hurdle	0.700/	9.70%	0.700/	0.700/
Rate	8.70%	8.70%	8.70%	8.70%	Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	14	12	11	8	Payback Period (in years)	11	10	9	8
Discounte d payback Period (in years)	NA	35	20	11	Discounte d payback Period (in years)	29	20	15	11
Internal Rate of Return (in %)	7%	9%	12	19%	Internal Rate of Return (in %)	9%	11%	14%	19%
IJC	CRT20053	02 Interna	ational Journ	al of Creative R	esearch Th	oughts (I.	JCRT) <u>www</u> .	ijcrt.org	2279

Project Nat 01)	me:NH-44	(Old NH							
Project Ca	oital Inves	tment (in ₹ cro	ores):2747.5						
Tollable Le	ength (in H	KM):110.00							
Expected T	raffic per	Day (in PCU/I	Day): 71779						
Toll charge	es per vehi	icle (in ₹/ PCU	per Journey):	125					
Design Cap	pacity (in	PCU):90000							
Sensitivity									
Sensitivity	of the pro	ject with annua	al incr <mark>ease</mark> in to	oll rate	Sensitivity of	of the projec	t with annual i	ncrease in traf	fic
	Base toll rate (in ₹ per vehicl e)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)	1	Expecte d Traffic per Day (in PCU/Da y)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	13	12	10	9	Payback Period (in years)	13	12	10	9
Discount ed payback Period (in years)	NA	28	18	13	Discounte d payback Period (in years)	NA	28	18	13
Internal Rate of Return (in %)	8%	10%	13%	18%	Internal Rate of Return (in %)	8%	10%	13%	18%

Table 30: Snapshot of Project NH-16 financial performance analysis

Table 29: Snapshot of Project NH-16 financial performance analysis

Project Name:NH-10 [Rohad]

Project Capital Investment (in ₹ crores):486

Tollable Length (in KM):55.722

Expected Traffic per Day (in PCU/Day): 30902

Toll charges per vehicle (in ₹/ PCU per Journey): 60

1000	<u> </u>			-	- 1	/			
Design Ca	pacity (in	PCU): 84000							
Sensitivity	Analysis	with Changes	in Key Variab	les					
Sensitivity	of the pro	ject with annu	al increase in	toll rate	Sensitivity	of the proje	ct with annual	increase in trat	ffic
	Base toll rate (in ₹ per vehicl e)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)		Expecte d Traffic per Day (in PCU/Da y)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	11	10	9	8	Payback Period (in years)	11	10	9	8
Discount ed payback Period (in years)	31	20	15		Discounte d payback Period (in years)	31	20	15	12
Internal Rate of Return	00/	110/	140/	100/	Internal Rate of Return	00%	110/	1404	10%
(III %) 9% 11% 14% 19% Table 31: Snapshot of Project NH-16 financial performance analysis Project Name:NH-33 [Pundag] Project Capital Investment (in ₹ crores):625.07 Tollable Length (in KM):58.067									
Toll charge Design Ca	es per veh pacity (in	icle (in ₹/ PCU PCU):40000	J per Journey):	100					
Sensitivity	Analysis	with Changes	in Key Variab	les					_
Sensitivity	of the pro	oject with annu	al increase in	toll rate	Sensitivity	of the project	ct with annual	increase in trat	ffic
	Base toll rate (in ₹ per vehicl e)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)		Expecte d Traffic per Day (in PCU/Da y)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50

Payback Period (in years)	10	9	8	7	Payback Period (in years)	10	9	8	8
Discount ed payback Period (in years)	21	16	13	10	Discounte d payback Period (in years)	21	16	13	10
Internal Rate of Return (in %)	11%	13%	16%	20%	Internal Rate of Return (in %)	11%	12%	15%	20%

Table 32: Snapshot of Project NH-16	financial performance analysis
-------------------------------------	--------------------------------

Project Capital Investment (in ₹ crores):601.67 Tollable Length (in KM):80													
Tollable Length (in KM):80													
ollable Length (in KM):80													
Expected Traffic per Day (in PCU/Day): 31579	Toll charges per vehicle (in ₹/ PCU per Journey): 100												
Toll charges per vehicle (in ₹/ PCU per Journey): 100													
Design Capacity (in PCU):40000													
Sensitivity Analysis with Changes in Key Variables													
Sensitivity of the project with annual increase in toll rate Sensitivity of the project with annual increase in traffic	с												
Page													
toll Expecte													
rate d Traffic													
(in ₹ per Day	1												
per annual annual annual (in annual annual annual annual annual) (in annual annual) (in annual annual) (in	annual increase(10												
e) %) %) %) y) %) %)	%)												
Hurdle													
Rate 8.70% 8.70% 8.70% 8.70% Rate 8.70% 8.70% 8.70%	8.70%												
Project													
Life 50 50 50 50 Life 50 50 50	50												
Payback Payback Period (in													
(in years) 8 8 7 7 years) 8 8 7	7												
Discount													
ed Discounte													
Payback d payback Period (in													
(in years) 14 12 10 9 years) 14 12 10	9												
Internal Internal													
Rate of Rate of Pature													
(in %) 13% 15% 18% 23% $(in %)$ 13% 15% 18%	23%												

Table 33: Snapshot of Project NH-16 financial performance analysis

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Sensitivity of the project with annual increase in traffic

Project Name:NH-7 [Bagepain]

Project Capital Investment (in ₹ crores):402.87

Tollable Length (in KM):71.450 Expected Traffic per Day (in PCU/Day): 18502

Toll charges per vehicle (in ₹/ PCU per Journey): 90

Design Capacity (in PCU):50000

Sensitivity Analysis with Changes in Key Variables

Sensitivity of the project with annual increase in toll rate

	Base toll rate (in ₹ per vehicl e)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)		Expecte d Traffic per Day (in PCU/Da y)	annual increase(2 %)	annual increase(5 %)	annual increase(10 %)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	10	10	9	8	Payback Period (in years)	10	10	9	8
Discount ed payback Period					Discounte d payback Period (in				
(in years) Internal Rate of	24	17	14	11	years) Internal Rate of	24	18	14	11
Return (in %)	10%	12%	15%	20%	Return (in %)	10%	12%	15%	20%

Table 34: Sn	apshot of l	Project NH-	-16 financi	al performa	nce analys	sis		Sec.			
Project Name	: NH-73 [E	Brahamarako	otlu]								
Project Capit	al Investme	ent (in ₹ croi	res): 181.5								
Tollable Length (in KM): 18.137											
Expected Traffic per Day (in PCU/Day): 33886											
Toll charges per vehicle (in ₹/ PCU per Journey): 25											
Design Capac	city (in PCU	J): 40000									
Sensitivity Analysis with Changes in Key Variables Sensitivity Analysis with Changes in Key Variables										S	
Sensitivity of	the project	with annua	l increase in	toll rate		Sensitivity of the project with annual increase in traffic					
	Base toll rate (in ₹ per vehicle)	annual increase(2%)	annual increase(5%)	annual increase(10%)			Expected Traffic per Day (in PCU/Day)	annual increase(2%)	annual increase(5%)	annual increase(10%)	
Hurdle Rate	8.70%	8.70%	8.70%	8.70%		Hurdle Rate	8.70%	8.70%	8.70%	8.70%	
Project Life	50	50	50	50		Project Life	50	50	50	50	

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Payback Period (in years)	9	9	8	7	Payback Period (in years) 9 9 8 7
Discounted payback Period (in years)	18	14	12	10	Discounted payback Period (in years) 18 14 12 10
Internal Rate of Return (in %)	11%	13%	16%	21%	Internal Rate of Return (in %) 11% 13% 16% 21%

Table 35: Si	napshot of	Project NH	I-16 financi	al performance analy	ysis				
Project Nam	e: NH-4 [C	halageri]							
Project Capi	tal Investm	ent (in ₹ cro	res): 484.08						
Tollable Ler	ngth (in KM	1): 60.98							
Expected Tr	affic per Da	y (in PCU/I	Day): <mark>25023</mark>		A CONTRACTOR	No			
Toll charges	per vehicle	e (in ₹/ PCU	per Jo <mark>urney</mark>): 75					
Design Capa	city (in PC	U): 40000		200		Scotter.	Sec.		
Sensitivity A	analysis wit	h Changes i	n Key <mark>Varia</mark>	bles	Sensitivity A	analysis with (Changes in H	Key Variable	es
Sensitivity o	f the projec	t with annua	al incr <mark>ease ir</mark>	toll rate	Sensitivity o	f the project v	<mark>vith annu</mark> al i	ncrease in tr	affic
								1	
	Base					F		1 1	
	ton rate	annual	annual	annual		Expected Traffic per	annual	annual	annual
	per	increase(increase(increase(Day (in	increase(increase(increase(
	vehicle)	2%)	<mark>5</mark> %)	10%)		PCU/Day)	2%)	5%)	10%)
Hurdle					Hurdle	//	204	1	
Rate	8.70%	8.70%	8.70%	8.70%	Rate	8.70%	8.70%	8.70%	8.70%
Project	Ale and				Project	143	100 A		
Life	50	50	50	50	Life	50	50	50	50
Payback		144		State Line	Payback				
Period (in					Period (in				
years)	11	10	9	8	years)	-11 -	10	9	8
Discounted					Discounted				
payback					payback				
Period (in					Period (in				
years)	29	19	15	11	years)	29	20	15	11
Internal					Internal				
Rate of					Rate of				
Return (in					Return (in				
%)	9%	11%	14%	19%	%)	9%	11%	14%	19%

Table 36: Snapshot of Project NH-16 financial performance analysis

Project Name: NH-75 [Gaddurur] Project Capital Investment (in ₹ crores): 141.11

Tollable Length (in KM): 17.588
Expected Traffic per Day (in PCU/Day): 18105
Toll charges per vehicle (in ₹/ PCU per Journey): 25

Sensitivity Analysis with Changes in Key Variables Sensitivity of the project with annual increase in toll rate

Design Capacity (in PCU): 50000

Sensitivity Analysis with Changes in Key Variables
Sensitivity of the project with annual increase in traffic

	Base toll rate (in ₹ per vehicle)	annual increase(2%)	annual increase(5%)	annual increase(10%)		Expected Traffic per Day (in PCU/Day)	annual increase(2%)	annual increase(5%)	annual increase(10%)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	13	12	10	9	Payback Period (in years)	13	12	11	9
Discounted payback Period (in years)	NA	29	18	13	Discounted payback Period (in years)	NA	30	19	13
Internal Rate of Return (in %)	8%	10%	13%	18%	Internal Rate of Return (in %)	8%	10%	13%	17%

Table 37: Snapshot of Project NH-16 financial performance analysis

Project Name: NH-48 [Karjeevanhalli] Project Capital Investment (in ₹ crores): 1142 Tollable Length (in KM): 57 Expected Traffic per Day (in PCU/Day): 46600 Toll charges per vehicle (in ₹/ PCU per Journey): 80 Design Capacity (in PCU): 120000

Province -

Sensitivity Analysis with Changes in Key Variables Sensitivity of the project with annual increase in toll rate Sensitivity Analysis with Changes in Key Variables Sensitivity of the project with annual increase in traffic

	Base toll rate (in ₹ per vehicle)	annual increase(2%)	annual increase(5%)	annual increase(10%)			Expected Traffic per Day (in PCU/Day)	annual increase(2%)	annual increase(5%)	a i 1
Hurdle Rate	8 70%	8 70%	8 70%	8 70%	Hurd	e Rate	8 70%	8 70%	8 70%	\$
Hurdie Kale	0.7070	0.7070	0.7070	0.7070	Turu	e Rate	0.7070	0.7070	0.7070	0
Project Life	50	50	50	50	Proje	ct Life	50	50	50	5
Payback Period (in					Payba	nck d (in				
years)	13	12	10	9	years)	13	12	10	9

Sensitivity Analysis with Changes in Key Variables

Sensitivity of the project with annual increase in traffic

Discounted payback Period (in years)	NA	28	18	13	Discounted payback Period (in years)	NA	28	18	13
Internal Rate of Return (in %)	8%	10%	13%	18%	Internal Rate of Return (in %)	8%	10%	13%	18%

Table 38: Snapshot of Project NH-16 financial performance analysis

Project Name: NH-48 [Hebbalu] Project Capital Investment (in ₹ crores): 420.62 Tollable Length (in KM): 71 Expected Traffic per Day (in PCU/Day): 24552 Toll charges per vehicle (in ₹/ PCU per Journey): 60

Design Capacity (in PCU): 40000

Sensitivity Analysis with Changes in Key Variables

Sensitivity of the project with annual increase in toll rate

	Base				and the second	Expected			
	toll rate					Traffic			
	(in ₹	annual	annual	annual		per Day	annual	annual	annual
	per	increase(increase(increase((in	increase(increase(increase(
	vehicle)	2%)	5%)	10%)		PCU/Day)	2%)	5%)	10%)
Hurdle					Hurdle			1 1	
Rate	8 70%	8 70%	8 70%	8 70%	Rate	8 70%	8 70%	8 70%	8 70%
Itute	0.1070	0.7070	0.7070	0.7070	Tute	0.1070	0.7070	0.7070	0.7070
Project	1				Project	1	1	States -	
Life	50	50	50	50	Life	50	50	50	50
Davback					Davback		Se 20	- %	
Period (in					Period (in	/	08	9.	
vears)	12	11	10	0	vears)	12	N N	10	Q
years)	12	11	10	1	years)	× 4.3	1 I.S.	10	,
	and the second				-	·	- 19 C		
Discounts	.1	1000		Star Land	Discounted	North Street			
Discounte	a	100			Discounted				
payback			100		payback Devied (in				
Period (in	NTA	24	17	10	Period (in	NIA	24	17	10
years)	ΝA	24	17	12	years)	NA	24	17	12
T., (T., (1				
Internal					Internal Data of				
Rate of					Rate of				
Keturn (in		110/	1.40/	100/	Keturn (in	00/	100/	120/	100/
<i>%</i>)	9%	11%	14%	18%	%)	9%	10%	15%	18%

Table 39: Snapshot of Project NH-16 financial performance analysis

 Project Name: NH-92 [Baretha (MoRTH)]

 Project Capital Investment (in ₹ crores): 314.53

 Tollable Length (in KM): 50

 Expected Traffic per Day (in PCU/Day): 15128

 Toll charges per vehicle (in ₹/ PCU per Journey): 70

 Design Capacity (in PCU): 25000

 Sensitivity Analysis with Changes in Key Variables

 Sensitivity of the project with annual increase in toll rate

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	Base toll rate (in ₹ per vehicle)	annual increase(2%)	annual increase(5%)	annual increase(10%)	_		Expected Traffic per Day (in PCU/Day)	annual increase(2%)	annual increase(5%)	annual increase(10%)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%		Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50		Project Life	50	50	50	50
Payback Period (in years)	14	12	11	9		Payback Period (in years)	12	11	10	9
Discounted payback Period (in years)	NA	35	20	13		Discounted payback Period (in years)	NA	26	18	13
Internal Rate of Return (in %)	7%	9%	12	18%	_	Internal Rate of Return (in %)	8%	10%	13%	18%
	and the second				i. i	680 BW	Nov.			

Table 40: Snapshot of Project NH-16 financial performance analysis

Project Name: NH-66 [Surathkal]

Project Capital Investment (in ₹ crores): 181.5

Tollable Length (in KM): 17.362

Expected Traffic per Day (in PCU/Day): 35080

Toll charges per vehicle (in ₹/ PCU per Journey): 50

Design Capacity (in PCU): 40000

Sensitivity Analysis with Changes in Key Variables

Sensitivity of the project with annual increase in toll rate

Sensitivity Analysis with Changes in Key Variables Sensitivity of the project with annual increase in traffic

	Base toll rate (in ₹ per	annual increase(annual increase(annual increase(\sim	Expected Traffic per Day (in	annual increase(annual increase(annual increase(
	vehicle)	2%)	5%)	10%)		PCU/Day)	-2%)	5%)	10%)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	5	5	5	4	Payback Period (in years)	5	5	5	4
Discounted payback Period (in years)	6	б	6	5	Discounted payback Period (in years)	6	6	6	5
Internal Rate of Return (in %)	23%	25%	28%	33%	Internal Rate of Return (in %)	23%	25%	28%	33%

Table 41: Snapshot of Project NH-16 financial performance analysis
Project Name: NH-66 [Talapady]
Project Capital Investment (in ₹ crores): 1050.1
Tollable Length (in KM): 13.2
Expected Traffic per Day (in PCU/Day): 423892

Toll charges per vehicle (in ₹/ PCU per Journey): 40

Design Capacity (in PCU): 29702

Sensitivity Analysis with Changes in Key Variables

Sensitivity of the project with annual increase in toll rate

Sensitivity Analysis with Changes in Key Variables Sensitivity of the project with annual increase in traffic

	Base toll rate (in ₹ per vehicle)	annual increase(2%)	annual increase(5%)	annual increase(10%)		Expected Traffic per Day (in PCU/Day)	annual increase(2%)	annual increase(5%)	annual increase(10%)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	3	3	3	3	Payback Period (in years)	3	3	3	3
Discounted payback Period (in years)	4	4	3	3	Discounted payback Period (in years)	4	4	3	3
Internal Rate of Return (in %)	38%	40%	43%	48%	Internal Rate of Return (in %)	38%	40%	43%	48%

Table 42: Snapshot of Project NH-16 financial performance analysis

Project Name: NH-3(old) NH52(New) [Chhapra] Project Capital Investment (in ₹ crores): 1897.4 Tollable Length (in KM): 58.05 Expected Traffic per Day (in PCU/Day): 830120 Toll charges per vehicle (in ₹/ PCU per Journey): 65 Design Capacity (in PCU): 60000 Sensitivity Analysis with Changes in Key Variables

Sensitivity of the project with annual increase in toll rate

Sensitivity Analysis with Changes in Key Variables	
Sensitivity of the project with annual increase in traffic	

	Base toll rate (in ₹ per vehicle)	annual increase(2%)	annual increase(5%)	annual increase(10%)		Expected Traffic per Day (in PCU/Day)	annual increase(2%)	annual increase(5%)	annual increase(10%)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	2	2	2	2	Payback Period (in years)	2	2	2	2

Discounted payback Period (in years)	2	2	2	2	Discounted payback Period (in years)	2	2	2	2
Internal Rate of Return (in					Internal Rate of Return (in				
%)	67%	69%	72%	77%	%)	67%	69%	72%	77%

Table 43: Snapshot of Project NH-16 financial performance analysis

Project Name: NH-3 [Indore Dewas (Indore Bypass)]
Project Capital Investment (in ₹ crores): 325
Tollable Length (in KM): 45.05
Expected Traffic per Day (in PCU/Day): 34246
Toll charges per vehicle (in ₹/ PCU per Journey): 50
Design Capacity (in PCU): 6600
Sensitivity Analysis with Changes in Key Variables
Sensitivity of the project with annual increase in toll rate

Sensitivity Analysis with Changes in Key Variables Sensitivity of the project with annual increase in traffic

	Base toll rate (in ₹ per vehicle)	annual increase(2%)	annual incr <mark>ease(</mark> 5%)	annual increase(10%)	ſ	Expected Traffic per Day (in PCU/Day)	annual increase(2%)	annual increase(5%)	annual increase(10%)
Hurdle Rate	8.70%	8.70%	8.70 <mark>%</mark>	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	8	8	7	7	Payback Period (in years)	8	8	7	7
Discounted payback Period (in years)	14	12	10	9	Discounted payback Period (in years)	14	12	10	9
Internal Rate of Return (in %)	13%	15%	18%	23%	Internal Rate of Return (in %)	13%	15%	18%	23%

Table 44: Snapshot of Project NH-16 financial performance analysis

Project Name: NH-3 [Jajau (Old Baretha)] Project Capital Investment (in ₹ crores): 1012.9 Tollable Length (in KM): 41.8 Expected Traffic per Day (in PCU/Day): 425284 Toll charges per vehicle (in ₹/ PCU per Journey): 55 Design Capacity (in PCU): 10 Sensitivity Analysis with Changes in Key Variables Sensitivity of the project with annual increase in toll rate

Sensitivity Analysis with Changes in Key Variables Sensitivity of the project with annual increase in traffic

Internal

Rate of

%)

Return (in

9%

11%

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-								-	
	D								
	Base toll rate					Expected			
	(in ₹	annual	annual	annual		Traffic per	annual	annual	annual
	per vehicle)	increase(2%)	increase(5%)	increase(Day (1n PCU/Day)	increase(2%)	increase(5%)	increase(10%)
Hurdle		_///	0,0)	10/0)	Hurdle	100,24)	_///	0,0)	10,0)
Rate	8.70%	8.70%	8.70%	8.70%	Rate	8.70%	8.70%	8.70%	8.70%
Project	50	50	50	50	Project	50	50	50	50
Life	50	50	50	50	Life	50	50	50	50
Payback					Payback				
vears)	2	2	2	2	vears)	2	2	2	2
J)					5				
					D				
Discounted payback					Discounte payback	d			
Period (in					Period (in				
years)	3	3	3	2	years)	3	3	3	2
Internal					Internal				
Rate of			² 200		Rate of				
Return (in		100			Return (in				
%)	55%	57%	60%	65%	%)	55%	57%	60%	64%
-									
Table 45: Si	napshot of 1	Project NH	-16 f <mark>inanc</mark> i	ial performance	analysis				
Project Name	e:NH-3 [Kh	alghat -MP	/Maha <mark>rashtr</mark>	a Border(Sendh	wa, Jamli)]	1		1 5	
Project Capit	tal Investme	ent (in ₹ cro	res): 786.39	`				1	
Tollable Len	gth (in KM): 82.8					1	1	
Expected Tra	affic per Da	y (in PCU/I	Day): 31026				/ /	di.	
Toll charges	per vehicle	(in ₹/ PCU	per Journey	r): 95			and the		
Design Capa	city (in PC)	U): 56000				//	~ M	5.	
Sensitivity A	analysis with	h Changes i	<mark>n K</mark> ey Varia	bles	Sensitivity Ar	alysis with Cha	anges in Key	Variables	
Sensitivity of	f the projec	t with annua	al increase in	n toll rate	Sensitivity of	the project with	annual inci	ease in traff	ic
		140		Care Start	1	iter 👘			
	Base toll	100				Expected			
	rate (in	annual	annual	annual		Traffic per	annual	annual	annual
	₹ per	increase(increase	(increase(Day (in	increase(increase(increase(
	vehicle)	2%)	5%)	10%)		PCU/Day)	2%)	5%)	10%)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback					Pavback				
Period (in					Period (in				
years)	11	10	9	8	years)	11	10	9	8
Discounted					Discounted				
payback					payback				
Period (in	24	01	1.5	10	Period (in	24	21	15	10
years)	34	21	15	12	years)	34	21	15	12

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19%

14%

Internal

Rate of

%)

Return (in

9%

11%

19%

14%

Table 46: Snapshot of Project NH-16 financial performance analysis

Project Name: NH-46(Old NH-3) [Pagara] Project Capital Investment (in ₹ crores): 1012.9 Tollable Length (in KM): 51.7 Expected Traffic per Day (in PCU/Day): 2104004 Toll charges per vehicle (in ₹/ PCU per Journey): 65 Design Capacity (in PCU): 10

Sensitivity Analysis with Changes in Key Variables Sensitivity of the project with annual increase in toll rate

Sensitivity Analysis with Changes in Key Variables Sensitivity of the project with annual increase in traffic

		Base toll rate (in ₹ per vehicle)	annual increase(2%)	annual increase(5%)	annual increase(10%)		Expected Traffic per Day (in PCU/Day)	annual increase(2%)	annual increase(5%)	annual increase(10%)
Huro Rate	dle	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Proje Life	ect	50	50	50	50	Project Life	50	50	50	50
Payt Perio year	oack od (in s)	2	2	2	2	Payback Period (in years)	2	2	2	2
Disc payb Perio year	counted back od (in s)	2	2	2	2	Discounted payback Period (in years)	2	2	2	2
Inter Rate Retu %)	rnal e of urn (in	64%	66%	69%	74%	Internal Rate of Return (in %)	64%	66%	69%	74%
year Inter Rate Retu %)	s) rnal e of ırn (in	2 64%	2 66%	2 69%	2 74%	years) Internal Rate of Return (in %)	2 64%	2 66%	2 69%	2

Table 47: Snapshot of Project NH-16 financial performance analysis

Project Name: NH-46(Old 3) [Purankhedi] Project Capital Investment (in ₹ crores): 759.98 Tollable Length (in KM): 85.31 Expected Traffic per Day (in PCU/Day): 2104004 Toll charges per vehicle (in ₹/ PCU per Journey): 105 Design Capacity (in PCU): 60000

Sensitivity Analysis with Changes in Key Variables Sensitivity of the project with annual increase in toll rate

Base toll rate (in ₹ annual annual annual per increase(increase(increase(10%) vehicle) 2%) 5%) Hurdle Rate 8.70% 8.70% 8.70% 8.70% Project Life 50 50 50 50 Payback Period (in 1 1 1 1 years)

Sensitivity Analysis with Changes in Key Variables Sensitivity of the project with annual increase in traffic

	Expected Traffic per Day (in PCU/Day)	annual increase(2%)	annual increase(5%)	annual increase(10%)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50
Payback Period (in years)	1	1	1	1

Sensitivity Analysis with Changes in Key Variables

Sensitivity of the project with annual increase in traffic

Discounted payback Period (in years)	1	1	1	1	Discounted payback Period (in years)	1	1	1	1
Internal Rate of Return (in %)	681%	683%	686%	691%	Internal Rate of Return (in %)	681%	683%	686%	691%

Table 48: Snapshot of Project NH-16 financial performance analysis

Project Name: NH3(old) NH52(New) [Rojwas]

Project Capital Investment (in ₹ crores): 1897.4

Tollable Length (in KM): 63.599

Expected Traffic per Day (in PCU/Day): 1081030

Toll charges per vehicle (in ₹/ PCU per Journey): 75

Design Capacity (in PCU): 60000

Sensitivity Analysis with Changes in Key Variables Sensitivity of the project with annual increase in toll rate

	Base toll rate (in ₹ per vehicle)	annual increase(2%)	annual increase(5%)	annual increase(10%)		Expected Traffic per Day (in PCU/Day)	annual increase(2%)	annual increase(5%)	annual increase(10%)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	1	1	1	1	Payback Period (in years)	1	1	1	1
Discounted payback Period (in years)	2	2	2	2	Discounted payback Period (in years)	2	2	2	2
Internal Rate of Return (in %)	101%	103%	106%	111%	Internal Rate of Return (in %)	101%	103%	105%	110%

Table 49: Snapshot of Project NH-16 financial performance analysis

Project Name: NH-3 [Baswant (Pimplegaon)] Project Capital Investment (in ₹ crores): 940

Tollable Length (in KM): 55.161
Expected Traffic per Day (in PCU/Day): 37186
Toll charges per vehicle (in ₹/ PCU per Journey): 140
Design Capacity (in PCU): 59000

Sensitivity Analysis with Changes in Key Variables	
Sensitivity of the project with annual increase in toll rate	

Sensitivity Analysis with Changes in Key Variables Sensitivity of the project with annual increase in traffic

	Base toll rate (in ₹ per vehicle)	annual increase(2%)	annual increase(5%)	annual increase(10%)		Expected Traffic per Day (in PCU/Day)	annual increase(2%)	annual increase(5%)	annual increase(10%)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	8	7	7	6	Payback Period (in years)	8	8	7	6
Discounted payback Period (in years)	13	11	10	8	Discounted payback Period (in years)	13	11	10	8
Internal Rate of Return (in %)	13%	15%	18%	23%	Internal Rate of Return (in %)	13%	15%	18%	23%

Table 50: Snapshot of Project NH-16 financial performance analysis

Project Name: 50 [Chandloi/ Rajgurunagar (MoRTH)] Project Capital Investment (in ₹ crores): 127.6 Tollable Length (in KM): 29

Expected Traffic per Day (in PCU/Day): 32988

Toll charges per vehicle (in ₹/ PCU per Journey): 25

Design Capacity (in PCU): 45000

Sensitivity Analysis with Changes in Key Variables	Sensitivity Analys
Sensitivity of the project with annual increase in toll rate	Sensitivity of the

Sensitivity Analysis with Changes in Key Variables
Sensitivity of the project with annual increase in traffic

	Base toll rate (in ₹ per vehicle)	annual increase(2%)	annual increase(5%)	annual increase(10%)		Expected Traffic per Day (in PCU/Day)	annual increase(2%)	annual increase(5%)	annual increase(10%)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	7	7	6	6	Payback Period (in years)	7	7	6	6

Sensitivity Analysis with Changes in Key Variables

Discounted payback Period (in years)	10	9	8	7	Discounted payback Period (in years)	10	9	8	7
Internal Rate of Return (in %)	16%	18%	21%	26%	Internal Rate of Return (in %)	16%	18%	20%	25%

Table 51: Snapshot of Project NH-16 financial performance analysis

Project Name: NH-9 [Kawdipath(MoRTH)] Project Capital Investment (in ₹ crores): 88.71 Tollable Length (in KM): 26 Expected Traffic per Day (in PCU/Day): 47130

Toll charges per vehicle (in ₹/ PCU per Journey): 25

Design Capacity (in PCU): 45000

Sensitivity Analysis with Changes in Key Variables

Sensitivity of the project with annual increase in toll rate

Sensitivity o	f the projec	t with annua	al incr <mark>ease ir</mark>	n toll rate	Sensitivity of the project with annual increase in traffic					
	Base toll rate (in ₹ per vehicle)	annual increase(2%)	annual increase(5%)	annual increase(10%)		Expected Traffic per Day (in PCU/Day)	annual increase(2%)	annual increase(5%)	annual increase(10%)	
Hurdle Rate	8.70%	8.70%	<mark>8</mark> .70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%	
Project Life	50	50	50	50	Pr <mark>oject</mark> Life	50	50	50	50	
Payback Period (in years)	4	4	4	3	Payback Period (in years)	4	4	4	3	
Discounted payback Period (in years)	4	4	4	4	Discounted payback Period (in years)	4	4	4	4	
Internal Rate of Return (in	37%	34%	37%	4206	Internal Rate of Return (in	37%	34%	37%	1106	

Table 52: Snapshot of Project NH-16 financial performance analysis

Project Name: NH-3 [Kharegaon(MoRTH)] Project Capital Investment (in ₹ crores): 104.84 Tollable Length (in KM): 23.5 Expected Traffic per Day (in PCU/Day): 13400 Toll charges per vehicle (in ₹/ PCU per Journey): 29 Design Capacity (in PCU): 95000

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Sensitivity Analysis with Changes in Key VariablesSensitivity Analysis with Changes in Key VariablesSensitivity of the project with annual increase in toll rateSensitivity of the project with annual increase in traffic

	Base toll rate (in ₹ per vehicle)	annual increase(2%)	annual increase(5%)	annual increase(10%)		Expected Traffic per Day (in PCU/Day)	annual increase(2%)	annual increase(5%)	annual increase(10%)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	11	10	9	8	Payback Period (in years)	11	11	9	8
Discounted payback Period (in years)	36	21	15	12	Discounted payback Period (in years)	36	21	16	12
Internal Rate of Return (in					Internal Rate of Return (in				
%)	9%	11%	14%	19%	%)	9%	11%	14%	19%

Table 53: Snapshot of Project NH-16 financial performance analysis

Project Name: NH-4 [Khedshivapur]

Project Capital Investment (in ₹ crores): 1724.55

Tollable Length (in KM): 80.7

Expected Traffic per Day (in PCU/Day): 82234

Toll charges per vehicle (in ₹/ PCU per Journey): 95

Design Capacity (in PCU): 120000

Sensitivity Analysis with Changes in Key Variables

Sensitivity of the project with annual increase in toll rate

Sensitivity Analysis with Changes in Key Variables Sensitivity of the project with annual increase in traffic

	Base toll rate (in ₹ per vehicle)	annual increase(2%)	annual increase(5%)	annual increase(10%)		Expected Traffic per Day (in PCU/Day)	annual increase(2%)	annual increase(5%)	annual increase(10%)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	10	9	8	7	Payback Period (in years)	10	9	8	7

Discounted payback Period (in years)	19	15	12	10	Discounted payback Period (in years)	19	15	12	10
Internal Rate of Return (in					Internal Rate of Return (in				
%)	11%	13%	16%	21%	%)	11%	13%	16%	21%

Table 54: Snapshot of Project NH-16 financial performance analysis

Project Name: NH-50 [Moshi (MoRTH)] Project Capital Investment (in ₹ crores): 127.6 Tollable Length (in KM): 29.79 Expected Traffic per Day (in PCU/Day): 50605 Toll charges per vehicle (in ₹/ PCU per Journey): 25 Design Capacity (in PCU): 45000 Sensitivity Analysis with Changes in Key Variables Sensitivity of the project with annual increase in toll rate

Sensitivity Analysis with Changes in Key Variables Sensitivity of the project with annual increase in traffic

	Base toll rate (in ₹ per vehicle)	annual increase(2%)	annual increase(5%)	annual increase(10%)	0	Expected Traffic per Day (in PCU/Day)	annual increase(2%)	annual increase(5%)	annual increase(10%)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	5	5	4	4	Payback Period (in years)	5	5	4	4
Discounted payback Period (in years)	6	6	5	5	Discounted payback Period (in years)	6	6	5	5
Internal Rate of Return (in %)	24%	26%	29%	34%	Internal Rate of Return (in %)	24%	26%	29%	34%

Table 55: Snapshot of Project NH-16 financial performance analysis

Project Name: NH-53 [Nandgaon Peth]	
Project Capital Investment (in ₹ crores): 567	
Tollable Length (in KM): 63.695	
Expected Traffic per Day (in PCU/Day): 20623	
Toll charges per vehicle (in ₹/ PCU per Journey): 95	
Design Capacity (in PCU): 240	
Sensitivity Analysis with Changes in Key Variables	Sensitivity Analysis with Changes in Key Variables
Sensitivity of the project with annual increase in toll rate	Sensitivity of the project with annual increase in traffic

Base

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	toll rate (in ₹ per vehicle)	annual increase(2%)	annual increase(5%)	annual increase(10%)		Expected Traffic per Day (in PCU/Day)	annual increase(2%)	annual increase(5%)	annual increase(10%)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	12	11	10	9	Payback Period (in years)	12	11	10	9
Discounted payback Period (in years)	NA	24	17	12	Discounted payback Period (in years)	NA	25	17	13
Internal Rate of Return (in %)	8%	10%	13%	18%	Internal Rate of Return (in %)	8%	10%	13%	18%
				100					

Table 56: Snapshot of Project NH-16 financial performance analysis

Project Name: NH-6 [Sendurwafa]

Project Capital Investment (in ₹ crores): 424

Tollable Length (in KM): 72.056

Expected Traffic per Day (in PCU/Day): 19575

Toll charges per vehicle (in ₹/ PCU per Journey): 80

Design Capacity (in PCU): 42000

Sensitivity Analysis with Changes in Key Variables Sensitivity of the project with annual increase in toll rate

Sensitivity Analysis with Changes in Key Variables Sensitivity of the project with annual increase in traffic

	Base toll rate (in ₹ per vehicle)	annual increase(2%)	annual increase(5%)	annual increase(10%)	\leq	Expected Traffic per Day (in PCU/Day)	annual increase(2%)	annual increase(5%)	annual increase(10%)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	11	10	9	8	Payback Period (in years)	11	11	10	8
Discounted payback Period (in years)	37	21	15	11	Discounted payback Period (in years)	37	22	16	12
Internal Rate of Return (in %)	9%	11%	14%	19%	Internal Rate of Return (in %)	9%	11%	14%	19%

Table 57: Snapshot of Project NH-16 financial performance analysis									
Project Name	e: NH-6 [W	EPL Matha	ni]						
Project Capit	tal Investm	ent (in ₹ cro	res): 484.19						
Tollable Len	gth (in KM): 45.43							
Expected Tra	affic per Da	y (in PCU/I	Day): 30717						
Toll charges	per vehicle	(in ₹/ PCU	per Journey): 50					
Design Capa	city (in PC	U): 42000							
Sensitivity A	nalysis wit	h Changes i	Sensitivity A	nalysis with (Changes in k	Key Variable	es		
Sensitivity of	f the projec	t with annua	l increase in	toll rate	Sensitivity of	the project w	vith annual i	ncrease in tr	affic
	Base toll rate (in ₹ per vehicle)	annual increase(2%)	annual increase(5%)	annual increase(10%)		Expected Traffic per Day (in PCU/Day)	annual increase(2%)	annual increase(5%)	annual increase(10%)
Hurdle Rate	8.70%	8.70%	8.70 <mark>%</mark>	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	13	11	11	9	Payback Period (in years)	13	12	11	9
Discounted payback Period (in years)	NA	19	19	13	Discounted payback Period (in years)	NA	31	19	14
Internal Rate of Return (in %)	8%	12%	13%	18%	Internal Rate of Return (in %)	8%	10%	12%	17%
/0/	070	1270	1370	10/0		070	1070	12/0	1770

Table 58: Snapshot of Project NH-16 financial performance analysis

Project Name: 6 [Baragarh (Barhaguda)]

Project Capital Investment (in ₹ crores): 909

Tollable Length (in KM): 80.2

Expected Traffic per Day (in PCU/Day): 24491

Toll charges per vehicle (in ₹/ PCU per Journey): 125

Design Capacity (in PCU): 12142

Sensitivity Analysis with Changes in Key Variables Sensitivity of the project with annual increase in toll rate Sensitivity Analysis with Changes in Key Variables Sensitivity of the project with annual increase in traffic

	Base toll rate (in ₹ per vehicle)	annual increase(2%)	annual increase(5%)	annual increase(10%)			Expected Traffic per Day (in PCU/Day)	annual increase(2%)	annual increase(5%)	annual increase(10%)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%		Hurdle Rate	8.70%	8.70%	8.70%	8.70%
-	IJCRT200530	2 Intern	ational Jo	urnal of Ci	reative Re	search	Thoughts (IJCF	T) <u>www.ij</u> c	crt.org	2298

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Project Life	50	50	50	50	Project Life	50	50	50	50	
Payback Period (in years)	12	11	10	9	Payback Period (in years)	12	11	10	9	
Discounted payback Period (in years)	NA	26	17	13	Discounted payback Period (in years)	NA	26	18	13	
Internal Rate of Return (in					Internal Rate of Return (in					

%)

8%

10%

13%

18%

%)

8%

10%

13%

18%

Table 59: S	napshot of	Project NH	-16 financi	ial performance analy	ysis				
Project Nan	ne: 16 [Gudi	pada (Old C	[] [] [] [] [] [] [] [] [] [] [] [] [] [
Project Cap	ital Investm	ent (in ₹ cro	res): 385.83						
Tollable Lei	ngth (in KM	(): 76.665		A. C.					
Expected T ₁	affic per Da	y (in PCU/I	Day): 27783		Alteras.				
Toll charges	s per vehicle	e (in ₹/ PCU	per Journey	r): 70		South Land			
Design Cap	acity (in PC	U): 40,000	1 5						
Sensitivity A	Analysis wit	h Changes i	n Key <mark>Varia</mark>	bles	Sensitivity A	nalysis with (Changes in F	Key Variable	es
Sensitivity of	of the project	t with annua	al incr <mark>ease in</mark>	n toll rate	Sensitivity o	f the project w	vith annual i	ncrease in tr	affic
`	1 9			1 (100		2	
	Base								
	toll rate					Expected		1. 4	
	(in ₹	annual	annual	annual		Traffic per	annual	annual	annual
	per	increase(increase(increase(Day (in	increase(increase(increase(
	venicie)	2%)	5%)	10%)	-	PCU/Day)	2%)	5%)	10%)
Hurdle	0.000	1.2			Hurdle	1	62	\$	
Rate	8.70%	8.70%	8.70%	8.70%	Rate	8.70%	8.70%	8.70%	8.70%
Project	146				Project	1.1			
Life	50	50	50	<u>50</u>	Life	50	50	50	50
Payback		See.		The set	Payback				
Period (in					Period (in				
years)	9	8	7	7	years)	9	8	8	7
Discounted					Discounted				
payback					payback				
Period (in	15	12	11	0	Period (in	15	13	11	0
years)	15	13	11	2	years)	15	15	11	7
Internal					Internal				
Rate of					Rate of				
Return (in					Return (in				
%)	12%	14%	17%	22%	%)	12%	14%	17%	22%

Table 60: Snapshot of Project NH-16 financial performance analysis

Project Name: 316 [Paat Sahanipur(Pipli)] Project Capital Investment (in ₹ crores): 524.9 Tollable Length (in KM): 54.15 Expected Traffic per Day (in PCU/Day): 24786 Toll charges per vehicle (in ₹/ PCU per Journey): 85 Design Capacity (in PCU): 40,000 Sensitivity Analysis with Changes in Key Variables

Sensitivity Analysis with Changes in Key Variables

Sensitivity Analysis with Changes in Key Variables Sensitivity of the project with annual increase in traffic

	Base toll rate (in ₹ per vehicle)	annual increase(2%)	annual increase(5%)	annual increase(10%)		Expected Traffic per Day (in PCU/Day)	annual increase(2%)	annual increase(5%)	annual increase(10%)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	11	10	9	8	Payback Period (in years)	11	10	9	8
Discounted payback Period (in years)	26	18	14		Discounted payback Period (in years)	26	18	14	11
Internal Rate of Return (in %)	10%	12%	15%	20%	Internal Rate of Return (in %)	10%	12%	15%	19%
					1 2	1100	67.76		

Table 61: Snapshot of Project NH-16 financial performance analysis

Project Nam	e: 16[Panik	holi]	an or the			į.					
Project Capi	tal Investm	ent (in ₹ cro	res): 372								
Tollable Len	gth (in KM): 74.5									
Expected Tra	affic per Da	ay (in PCU/I	Day): 29585								
Toll charges	per vehicle	e (in ₹/ PCU	per Journey): 85							
Design Capa	city (in PC	U): 40,000									
Sensitivity A	analysis wit	h Changes i	n Key Varia	bles		Sensitivity Analysis with Changes in Key Variables					
Sensitivity of	Sensitivity of the project with annual increase in toll rate						Sensitivity of the project with annual increase in traffic				
	Base toll rate (in ₹ per vehicle)	annual increase(2%)	annual increase(5%)	annual increase(10%)			Expected Traffic per Day (in PCU/Day)	annual increase(2%)	annual increase(5%)	annual increase(10%)	
Hurdle Rate	8.70%	8.70%	8.70%	8.70%		Hurdle Rate	8.70%	8.70%	8.70%	8.70%	
Project Life	50	50	50	50		Project Life	50	50	50	50	

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Payback Period (in years)	7	6	6	6	Payback Period (in years)	7	6	6	6
Discounted payback Period (in years)	10	9	8	7	Discounted payback Period (in years)	10	9	8	7
Internal Rate of Return (in %)	16%	18%	21%	26%	Internal Rate of Return (in %)	16%	18%	21%	26%

Table 62: Snapshot of Project NH-16 financial performance analysis

Project Nam	e: 16 [Serg	arh]							
Project Capi	tal Investm	ent (in ₹ cro	res): 444.83						
Tollable Len	gth (in KM	(): 62.641	² 200						
Expected Tra	affic per Da	ay (in PCU/I	Day): <mark>33232</mark>						
Toll charges	per vehicle	e (in ₹/ PCU	per Jo <mark>urney</mark>): 60	- AS CARDENING				
Design Capa	city (in PC	U): 40,000		and the second	1	Mittan			
Sensitivity A	nalysis wit	h Changes i	n Key <mark>Varia</mark>	bles	Sensitivity A	nalysis with (Changes in K	Key Variable	es
Sensitivity o	f the projec	t with annua	al incr <mark>ease ir</mark>	toll rate	Sensitivity of	f the project w	ith annual in	ncrease in tr	affic
	Base toll rate (in ₹	annual	annual	annual		Expected Traffic per	annual	annual	annual
	per	increase(increase(increase(Day (in	increase(increase(increase(
	vehicle)	2%)	5%)	10%)	_	PCU/Day)	2%)	5%)	10%)
Hurdle Rate	8.70%	8. <mark>70%</mark>	<mark>8.70%</mark>	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Pro <mark>ject</mark> Life	50	50	50	50
Payback Period (in years)	10	9	8	7	Payback Period (in years)	10	9	8	7
Discounted payback Period (in years)	19	15	12	10	Discounted payback Period (in years)	19	15	12	10
Internal Rate of Return (in	110/	120/	1.00	210/	Internal Rate of Return (in	110/	1.20/	1.00	210/
<i>%)</i>	11%	13%	10%	21%	%)	11%	15%	10%	21%

Table 63: Snapshot of Project NH-16 financial performance analysis

Project Name: 5A [Srirampur] Project Capital Investment (in ₹ crores): 586.92

Tollable Leng	th (in KM): 76.588	
Expected Tra	ffic per Day (in PCU/Day): 15974	
T 11 1		

Toll charges per vehicle (in ₹/ PCU per Journey): 120

Design Capacity (in PCU): 40,000

Sensitivity Analysis with Changes in Key Variables
Sensitivity of the project with annual increase in toll rate

Sensitivity Analysis with Changes in Key Variables Sensitivity of the project with annual increase in traffic

	Base toll rate (in ₹ per vehicle)	annual increase(2%)	annual increase(5%)	annual increase(10%)		Expected Traffic per Day (in PCU/Day)	annual increase(2%)	annual increase(5%)	annual increase(10%)
Hurdle Rate	8.70%	8.70%	8.70%	8.70%	Hurdle Rate	8.70%	8.70%	8.70%	8.70%
Project Life	50	50	50	50	Project Life	50	50	50	50
Payback Period (in years)	13	12	10	9	Payback Period (in years)	13	12	10	9
Discounted payback Period (in years)	NA	28	18	13	Discounted payback Period (in years)	NA	28	18	13
Internal Rate of Return (in %)	8%	10%	13%	18%	Internal Rate of Return (in %)	8%	10%	13%	18%
						-			



SENSITIVITY ANALYSIS OF DISCOUNTED PAYBACK PERIOD OF THE PROJECTS WITH ANNUAL INCREAS IN TOLL RATE:

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INTERPRETATION:

From the graph we can clearly see that on increasing the toll rate by 2%, there is a reduction in payback period. The recovery time is reducing slightly, but the reduction curve is not that steep, except for a few projects. For most of the projects the curve is flattened and it gets more flat, when there is further increase in toll rates by 5% and 10% respectively. This shows that on increasing the toll rates, there is no major reduction in payback period.

SENSITIVITY ANALYSIS OF DISCOUNTED PAYBACK PERIOD OF THE PROJECTS WITH ANNUAL INCREAS IN TRAFFIC FLOW RATE:



INTERPRETATION:

On increasing the traffic also, there is not much reduction in payback time, except for a few projects Increase in traffic flow rate is also giving similar results, as we can get from increasing toll rates for the recovery of amount that is invested (payback period).

VI. FINDINGS AND CONCLUSION

1. Toll rate has a significant relationship with capital investment and tollable length., which means toll rate is dependent on both these factors. Highway projects with more initial capital investment have more toll rates compared to other projects. Similarly, highway roads with more tollable length have high toll charges

comparatively.

- 2. In order to check the sensitivity of the projects with respect to changes in key variables (toll rate, traffic) and how it affects the discounted payback period, both toll rate and traffic were increased by 2%, 5% and 10% respectively. This resulted in only a minor reduction in discounted payback period accept for a few projects. For traffic also, results were similar to that of toll rate, increase in traffic rate do change the payback period and reduced it but to a very minor extend.
- 3. Discounted payback period of projects with less IRR value is very high, most of the projects in the sample with IRR = 8% or less, and no change/ increment in tollrates and traffic are not able to recover the amount even in 50 years (assumed project life taken in the study).

CONCLUSION:

Increment in toll rates by Government and other private players is not acceptable as we have seen in sensitivity analysis part, even after increasing the toll rates there is no major change in payback period. Though there is a slight change which can be achieved by the change in traffic rate, as increase in traffic flow rate is also giving similar results, as we can get from increasing toll rates. So, increase in toll rates is not acceptable, as every year in India road traffic is increasing with faster rate

VII. LIMITATIONS

- 1. One major limitation of this study is that the assessment is done on the basis of information which is available in public domain and therefore needs verification.
- 2. Apart from that the data available is not sufficient, initial investment capital is there but there is no mention about the operations and maintenance cost, which is a major counting factor for highway road assessment.
- 3. Nature of data is secondary, the quality of study would have been better if the data was primary in nature.
- 4. During sensitivity analysis while increasing one key variable, we have considered other factors to be constant, which is technically not possible.

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