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CASE STUDIES

OPERATIONS AND FINANCE

Contents

CASE STUDY

Case Study on Inventory control - M/s ABC Limited – a Two-Wheeler Manufacturing Company

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M/s ABC Ltd., is a two-wheeler manufacturing company, whose brand was popular in India and had more than 60% market share. Mr. Banarjee, Managing Director of the company had no formal degrees, but had strong leadership and entrepreneur skills. The company had enjoyed the success under his leadership, for almost 10 years and sales and Marketing department people were the happiest people amongst other employees of the organization, as they had little or no work. The product was sold on it's own.

The company had a vendor base of 115 and all vendors were happy with the customer. In order to keep the market flooded with bikes, the management had given an instruction to purchase department to have sufficient inventory, so that the production would never stop for want of material. Also, purchase in-charge, was told that he would face serious actions, if the production stops for want of parts.

Hence, the purchase in-charge, had instructed all his team members to establish minimum 3 vendors for each part, so that if one fails to supply the parts, the company could depend on other vendor.

Mr.Banarjee, firmly believed that the vendors are extended arm of the company and should be treated well. Since the power cost, salary of the workers, was increasing yearly, and the schedule given to each vendor was less, because of more number of vendors, every year the vendors were asking for a price increase. Mr. Banerjee, who had understood the situation well, was approving a price increase of almost 9-12% to vendors

Out of all the total parts required for production, 60 % were imported. Mr. Banerjee was happy with the quality of the imported parts. Because of weakening of rupee against dollar, the total cost of imported component was going up every year by 4-5 %. Since the lead time was more

for imported component, and to ensure no production stoppage, inventory of 1 year, for imported component were maintained.

Now a new Japanese company had collaboration with one Indian company and started it's manufacturing company in Gujarat. Because of the stylish look of the bikes and their competitive prices when compared to the prices of bikes from M/s ABC ltd., customers slowly started to go for the bikes manufactured by Japanese company. With this, the market share of M/s ABC ltd., dropped from 60 % to 30 % and company was struggling for survival.

Now Mr.Banarjee decided to get a new CEO, to bring back the company business to it's original level.

Mr. Aravind Iyer, a post graduate from IIM, Ahmadabad was selected for this post. For one month the new CEO made a detailed analysis and identified the areas for reducing the price. His focus was on high inventory cost of the parts. He strongly recommended that Purchase department should take serious steps in controlling the price.

But the Purchase in-charge, strongly opposed the statement of new CEO. He clearly indicated that all vendors are supplying the parts as per requirement and production has never stopped. Also, whatever material is purchased, it is getting converted into finished parts and sold in the market and hence this will not create any kind of loss to the organization.

Mr. Banerjee was convinced by the argument of Purchase in-charge.

If you are the new CEO of the company, what were your actions for the following.

1. What are the steps for reducing the inventory?
2. Do you think, the decision taken by Purchase in-charge, to have 3 vendors is right? Substantiate with reasons?
3. Is the leadership style of Mr. Banerjee acceptable. Please discuss and indicate the reasons for your answer.
4. Inspite of successful leadership for 10 years by Mr. Banerjee, why the company started loosing to competitor
5. What are the steps to be taken by purchase to cut down the price?

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Case Study of M/s CHT in TQM

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ISBR Business School

Mr. Suresh Krishna, Joint Managing Director (JMD) one of the Medium scale industries M/s CHT, with approx.70 operators working in 3 shifts. M/s CHT got an order from M/s RB, one of the major Automobile industry, to supply few products. M/s CHT was the single source for the products for which order was released by their customer M/s RB. There was an agreement between M/s RB and M/s CHT, to supply the product as per the schedule and any variation in meeting customer's requirement as regard to quality and quantity, would attract heavy penalty.

Off late there were continuous complaints from customer either regarding the quality or non supply of required products. Mr. Suresh Krishna could not handle this alone and decided to recruit, an experienced person from a reputed manufacturing company as CEO, to look after the company. After an extensive search, he was able to short list Mr. Krish, who had worked for 25 years in various departments of a reputed automotive industry, After looking at his profile and achievements, JMD decided that he is the right person to work as CEO for his company and appointed him by giving him attractive remuneration and perks.

JMD was sure that, new CEO would take the company to greater heights.

Mr.Krish reported for duty on 20.01.2014 and took over the charge of M/s CHT as CEO. He went through all the records and noticed that there is a huge amount of penalty paid towards non adherence to agreement. There was a continuous failure to meet the schedules given by customer.

Immediately he called for a meeting with Production and Quality heads. He instructed the production head, to fix a target for each operator. He also warned the production head that at any cost the targets have to be fulfilled and any deviation would be viewed seriously and they should be ready to face dare consequences. He also instructed the Quality head to ensure that all the products which goes out should be of good quality and would not accept any customer complaints.

Every day morning, there used to be a sunrise meeting to decide the targets for the day and same thing would be reviewed in the sunset meeting. The new CEO monitored the progress personally and there was a continuous improvement as regard to quality and quantity. The no. of calls what the JMD was receiving from customer became ZERO. JMD was impressed with the progress and felt happy that he selected the right candidate.

After one year, CEO resigned from the company, giving his personal reasons. Now, JMD decided to handle the activities himself till a new CEO is appointed. JMD decided to visit the factory on daily basis, which he had stopped for last 8 months.

On his visit he noticed that most of the operators were new and they looked like working under tension. He noticed a locked room. When enquired, he was told that it was a quarantine room. When he opened the lock, he found a heap of products, lying in containers. When asked with quality head, he was told that there is a 100% inspection for all products and whatever is not confirming to the specifications, would be rejected and stored in this room.

1. From the above, identify any 5 points out of 14 quality principles of Dr.Deming, which was not adhered to. Also explain in brief, what went wrong.

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Case Study in TQM - M/s Auto CNC

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M/s Auto CNC, a medium scale automotive industry, supplying to major automotive MNC's in Bangalore, was operating with low profit. The MD decided to take the support of his son, who had just completed his MBA from Germany. MD had immense faith in his son's capability and he was sure that his son would take the company to greater heights.

Since there was no work experience for his son, MD made him as General Manager, so that he can work for some time and get in depth knowledge of the total unit.

First day, MD announced in the office that his son is the in charge for the whole factory. Son took in charge of the plant. First one week he spent time with all the department heads collecting the details. He got few vital information, which is as below.

From Department heads:

1. Most of the machines are old and breaks down frequently.
2. There are lot of customer complaints, because of this.

From Staffs:

1. Each department works as a different company, focusing to achieve department targets
2. The stiff target given by the department heads, had made the workers work under fear of losing their jobs.
3. Department heads were getting targets from management and same targets were given to their subordinates. Whenever, the subordinates face problem, they were approaching department heads for support, they were told "I do not know how you do it. But you need to meet your targets".
4. Also, purchase was placing the order on lowest bid and hence the quality of the supplies from supplier

General points noticed during discussion:

1. Also, since the company was not making good business, to cut down the expenditure, all trainings were stopped.
2. Since everyone was struggling for achieving the target, there was no focus on

continuous improvement.

3. Inspectors department was under severe pressure, as there were lot of quality complaints and they were really confused about where to focus. They were shuttling between quality complaints of the supplier parts and the customer complaints.

A) If you were the General Manager, what steps would you have taken?

B) Which are the Deming's Quality principles not followed? Justify each point and provide solution for each.

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CASE STUDY

Circus Swap

– Kirron Bindu
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A Swap involves 2 parties exchanging cash flows are certain intervals of time for an agreed duration of time. Swaps are useful to change the character of the loan from fixed to floating rate or to convert foreign currency obligation to a home currency obligation

The parties may draw up a contract defining each other's roles and obligations under a swap. An intermediary may act as a middle man for the two counterparties. In the piece that follows we will look at the inner workings of a circus swap.

While an Interest rate swap involves the parties exchanging cash flows based on the movement in the referenced interest rates for a fixed interest rate the Currency swap involves exchanging cash in one currency for another to meet certain loan repayment obligations.

A circus swap involves exchanging currencies of different countries and exploiting the interest rate differential between the two countries. Thus, a circus swap is a currency swap and an interest rate swap. The available texts explain interest rate swaps in detail and currency swaps in somewhat detail but a detailed explanation and illustration is not available for a circus swap.

In the case that follows we see how two students can, after meeting on social media and discovering significant arbitrage opportunities exists in the form of student loan differential structure the swap.

They agree to borrow in each other's currency in each other's financial institution and swapping the loan. They each need a sum equivalent of USD 20,000 to pay the tuition to their institutions.

They gather the following information

Spot Exchange between

USD/INR	64
USD/Yen	87
Yen/INR	0.7356

Rf (Risk free rate)

Indian	6.50%
Japanese	1%

	Student Loan	Rate of Interest	Tenure for repayment in years
Indian	₹ 1,280,000	13%	7
Japanese	¥1,740,000	2%	7

A) Structure a circus swap to apportion the savings equally between the two counter parties. After Preparing the Loan Amortization Table.

B) Identify the specific risks the two parties have to track over the life of this arrangement and how can they manage it.

C) How did you factor in exchange rate fluctuation while tailoring the cash flows?

D) Explain how you arrived at the payments between the counterparties.

Solution

Equated Annual Installments

Using the Present Value of an Annuity the Installment works out to ₹ 289,421.83 for the Indian student and ¥268,850.80 for the Japanese student.

Using the relative interest rates they forecast the next 7 forward rates as follows

Exchange Rate	Spot Rate ₹ 0.736	1 yr ₹ 0.776	2 yr ₹ 0.818	3 yr ₹ 0.862
	4 yr ₹ 0.909	5 yr ₹ 0.959	6 yr ₹ 1.011	7 yr ₹ 1.066

They notice that Indian Rupee is weakening against the Japanese Yen over the next 7 years and decide to structure their cash flows to take advantage of this.

The Indian Student agrees to repay the loan taken by the Japanese student in India from an Indian Bank in Indian Rupees. This is reciprocated by the Japanese student who agrees to repay the student loan taken on by the Indian student in Japan in Yen. It becomes easy for both to service the loan because interest payment and principal repayment is in their respective home currency cash flows.

As we shall see later the Indian student gets his loan at a much lower rate of interest than the 13% while the Japanese gets loan from alternative funding source and if no bank in his country would lend to him but are willing to lend to a foreign borrower such an arrangement is beneficial for him also.

We are now suspending any legality of whether this can be done or do laws allow payment to a foreigner without deducting Tax at source etc and focusing purely on the financial engineering aspect of Circus Swap.

In the amortization table that follows the Interest is calculated on the diminishing balance of the Principal outstanding and is deducted first before the installment is used to recoup the principal and over the tenure of the loan the balance goes to zero.

The amortization table looks as follows: -

Indian Will repay the Loan taken by the Japanese							
EAI	₹289,422	₹289,422	₹289,422	₹289,422	₹289,422	₹289,422	₹289,422
Less: Interest	₹166,400	₹150,407	₹132,335	₹111,914	₹88,838	₹62,762	₹33,296
Principal	₹123,022	₹139,015	₹157,087	₹177,508	₹200,584	₹226,660	₹256,126
Balance o/s	₹1,156,978	₹1,017,964	₹860,877	₹683,369	₹482,785	₹256,126	₹0

Now the Amortization table of the Japanese student repaying the loan of the Indian student is computed similarly.

Japanese wil repay the loan taken by the Indian							
EAI	¥268,850.80	¥268,850.80	¥268,850.80	¥268,850.80	¥268,850.80	¥268,850.80	¥268,850.80
Less: Interest	¥34,800.00	¥30,118.98	¥25,344.35	¥20,474.22	¥15,506.69	¥10,439.80	¥5,271.58
Principal	¥234,050.80	¥238,731.82	¥243,506.46	¥248,376.59	¥253,344.12	¥258,411.00	¥263,579.22
Balance o/s	¥1,505,949.20	¥1,267,217.38	¥1,023,710.92	¥775,334.34	¥521,990.22	¥263,579.22	¥0.00

Thus lining up the initial cash inflow due to loan and the repayment of the annual installment for 7 years we compute the IRR for Indian Student.

CF	-₹1,280,000.00	₹289,421.83	₹289,421.83	₹289,421.83	₹289,421.83	₹289,421.83	₹289,421.83	₹289,421.83	13.000%

Japanese Student

CF	-¥1,280,000.00	¥289,421.83	¥289,421.83	¥289,421.83	¥289,421.83	¥289,421.83	¥289,421.83	¥289,421.83	13.000%

Thus we see that the IRR for the Indian student is nothing but the Interest rate on the loan and similar is the case of the Japanese student. Although the first is cash inflow due to the loan and the rest are cash outflows due to repayment we have reversed the arithmetic sign to get to the IRR.

Now to equalize the IRR so that savings are apportioned equally between the too one final cash payment is designed to go from the Japanese student to the Indian Student. This can be arrived at using the Goal seek in Excel spreadsheet being used to structure this swap arrangement.

First Table below shows the cost for both before one final payment is done

Indian Will repay the Loan taken by the Japanese									
EAI		₹289,422	₹289,422	₹289,422	₹289,422	₹289,422	₹289,422	₹289,422	
Less: Interest		₹166,400	₹150,407	₹132,335	₹111,914	₹88,838	₹62,762	₹33,296	
Principal		₹123,022	₹139,015	₹157,087	₹177,508	₹200,584	₹226,660	₹256,126	
Balance o/s		₹1,156,978	₹1,017,964	₹860,877	₹683,369	₹482,785	₹256,126	₹0	
Received		₹0	₹0	₹0	₹0	₹0	₹0	₹0	
CF	**-₹1,280,000.00**	**₹289,421.83**	**₹289,421.83**	**₹289,421.83**	**₹289,421.83**	**₹289,421.83**	**₹289,421.83**	**₹289,421.83**	**13.000%**

Japanese wil repay the loan taken by the Indian									
EAI		¥268,850.80	¥268,850.80	¥268,850.80	¥268,850.80	¥268,850.80	¥268,850.80	¥268,850.80	
Less: Interest		¥34,800.00	¥30,118.98	¥25,344.35	¥20,474.22	¥15,506.69	¥10,439.80	¥5,271.58	-11.00%
Principal		¥234,050.80	¥238,731.82	¥243,506.46	¥248,376.59	¥253,344.12	¥258,411.00	¥263,579.22	
Balance o/s		¥1,505,949.20	¥1,267,217.38	¥1,023,710.92	¥775,334.34	¥521,990.22	¥263,579.22	¥0.00	
Paid to Indian		¥0.00	¥0.00	¥0.00	¥0.00	¥0.00	¥0.00	¥0.00	
CF	**-¥1,740,000.00**	**¥268,850.80**	**¥268,850.80**	**¥268,850.80**	**¥268,850.80**	**¥268,850.80**	**¥268,850.80**	**¥268,850.80**	**2.000%**

After factoring in the last payment the Amortization table is provided below at attention is drawn to the IRR

Indian Will repay the Loan taken by the Japanese									
EAI		₹289,422	₹289,422	₹289,422	₹289,422	₹289,422	₹289,422	₹289,422	
Less: Interest		₹166,400	₹150,407	₹132,335	₹111,914	₹88,838	₹62,762	₹33,296	
Principal		₹123,022	₹139,015	₹157,087	₹177,508	₹200,584	₹226,660	₹256,126	
Balance o/s		₹1,156,978	₹1,017,964	₹860,877	₹683,369	₹482,785	₹256,126	₹0	
Received		₹43,439	₹45,804	₹48,298	₹50,929	₹53,702	₹56,626	₹59,710	
CF	**-₹1,280,000.00**	**₹245,983.11**	**₹243,617.64**	**₹241,123.35**	**₹238,493.24**	**₹235,719.90**	**₹232,795.53**	**₹229,711.92**	**7.174%**

Japanese wil repay the loan taken by the Indian									
EAI		¥268,850.80	¥268,850.80	¥268,850.80	¥268,850.80	¥268,850.80	¥268,850.80	¥268,850.80	
Less: Interest		¥34,800.00	¥30,118.98	¥25,344.35	¥20,474.22	¥15,506.69	¥10,439.80	¥5,271.58	0.00%
Principal		¥234,050.80	¥238,731.82	¥243,506.46	¥248,376.59	¥253,344.12	¥258,411.00	¥263,579.22	
Balance o/s		¥1,505,949.20	¥1,267,217.38	¥1,023,710.92	¥775,334.34	¥521,990.22	¥263,579.22	¥0.00	
Paid to Indian	¥56,000.00	¥56,000.00	¥56,000.00	¥56,000.00	¥56,000.00	¥56,000.00	¥56,000.00	¥56,000.00	
CF	**-¥1,740,000.00**	**¥324,850.80**	**¥324,850.80**	**¥324,850.80**	**¥324,850.80**	**¥324,850.80**	**¥324,850.80**	**¥324,850.80**	**7.176%**

Thus the Indian student will pay his annual installment and receive Yen 56,000 from his Japanese counterparty each year for 7 years. They can enter into a forward contract to freeze the exchange rate at which this transfer will go through.

Indian student repays the loan of the Japanese student while the Japanese student repays the loan of the Indian students. Since this happens in their respective home currency there is no foreign currency conversion risk.

Further the only stream of foreign currency conversion being the payment of Yen 56,000 from the Japanese student to the Indian student is hedged using forward cover at the interest rates forecasted today.

Thus the only risk that remains is the counter party risk of default which both the parties can decide how to manage.

We can now replace two corporations in the place of students and Increase the loan amount from $ 20,000 to say $200 million. Just the scale is bigger the mechanics remains the same.

Thus we see the Importance of using IRR is apportioning the costs between the two counterparties. We have developed a simple approach to understand swaps without any mathematical rigor. The same mechanism can be super imposed between two parties who want to exchange cash flows emanating from one asset for cash flows emanating from another asset and tailor the cash flows to suit their requirement.

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Analysis of Public Private Partnership in Road Construction contracts

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Kirron Bindu has domain expertise in Finance. His areas of Interest is Financial Derivatives and Risk Management. Starting in 1995 Kirron has experience in Accounting and Auditing areas too.

He is a Faculty Member of ISBR and authors Equity research reports and Sectoral Analysis. He also conducts Valuation of companies and has done so for many high tech startups in Bangalore.

His past corporate credentials Include Companies like Indus League Clothing Limited, MCS Software Consulting and System Domain. He has over 12 years of Teaching Experience in some of the Best schools in Bangalore and France. He has Presented Papers in conferences at the International Week at ESC Clermont (an AACSB accredited French Graduate School of Management) in 2009 and published articles for Journals.

He had delivered corporate training in Finance in Oracle, HP and Symbol Technologies. His training on Financial Spreadsheet Modeling has enhanced the learning experience of thousands of his students over the past 12 years.

Valuation Is another area of passion, in the recent past he has valued companies and natural resources like mines for Interest groups in the Social Activism sphere. He has experience analyzing the social cost of PPP and raising pertinent questions before the Regulatory authorities in the areas of civil aviation and Electric Utility Companies.

As a Mentor at a leading Accelerator called Kyron he has guided the financial projections and valuation effort of over a dozen promising tech startups. In his spare time Kirron is an avid fitness enthusiast. He like reading anything on Finance and follows global financial markets keenly.

Kirron is regularly invited to share his views on Union Budget at various forums including educational institutions like Jain University in the Past.

Executive Summary:

This case highlights the method to prepare a detailed financial analysis for public projects where Private contractor is mandated to carry out the work. The case discusses the Social Cost benefit and how the same is viewed from all stakeholders. As the case progresses and the financial analysis progresses to various stakeholders their views emerges and different pricing for the toll emerges. Various complexities are dealt with step by step to unravel all the issues that may arise. Mr Guruswamy and Mr Holla the two main Finance Executives in the thick of action prepare and iterate various versions of the financial plan taking cognizance of various stake holders. Finally, the apportionment of the benefits of the project becomes a bone of contention and the matter escalates to the regulator who decides of the eventual pricing. This case requires students to have prior Excel spreadsheet modelling skills in Finance and have an understanding of Capital Budgeting and Cash Flow Estimation. Scenario analysis and sensitivity analysis is also essential to know. Basic Charting techniques will be beneficial to now before attempting this case.

Background: Amaravati effect? 4 lakh more cars and bikes on Vijayawada's roads in just one year

Data accessed by TNM shows there is a boom when it comes to vehicle registrations in Vijayawada, one of the cities closest to the upcoming Amaravati.

Charan Teja

Friday, December 15, 2017 - 14:53

There were 3,73,320 more motorbikes on Vijayawada's streets between 2016 and 2017 January, according to transport department data accessed by TNM. This is an increase of 73.5% from the previous year – there were just over 5 lakh bikes in the city in 2016. Between 2015 and 2016, the growth was just 6.17%.

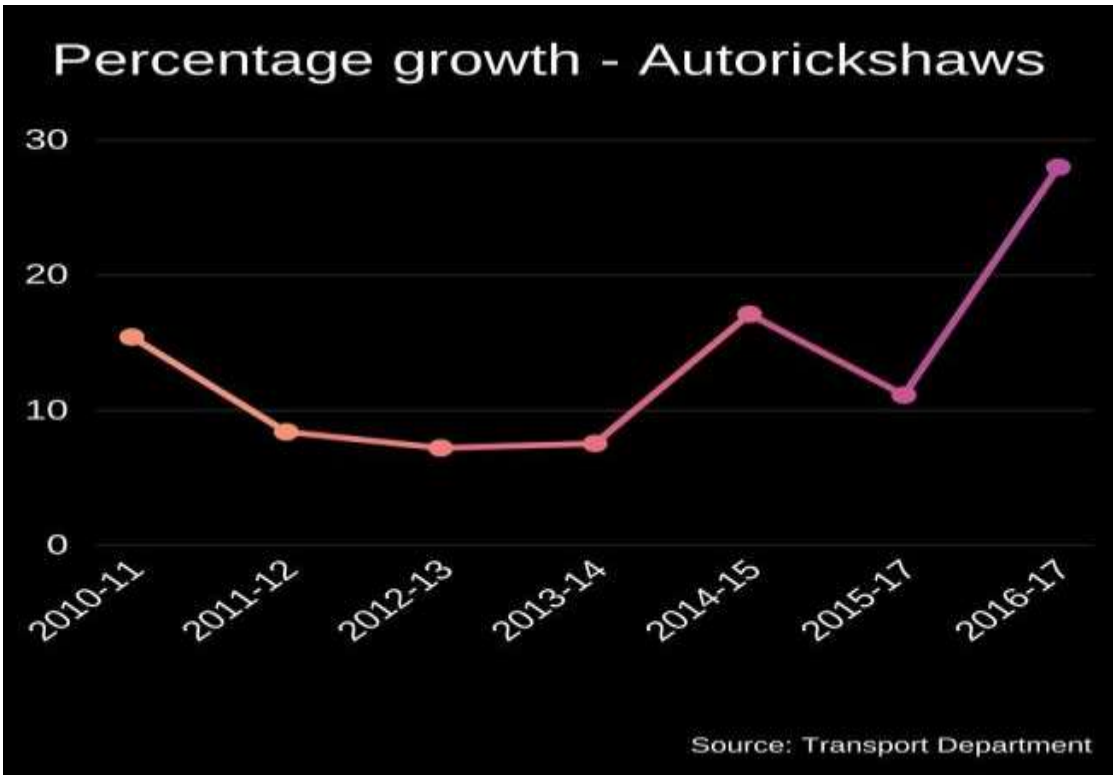
Similarly, the number of cars in the city has also seen a sudden increase: Whereas, there were 61,422 cars in Vijayawada in 2016, in 2017, the number increased to 85,931, which is a 40% rise, compared to 9.72% in the previous year.

It's not just non transport vehicles like cars and bikes, even vehicles used for transporting goods have seen a significant increase of 15%, from 94,259 in 2016 to 1,08,441 in 2017. Between 2015 and 2016, the increase was less than 10%.

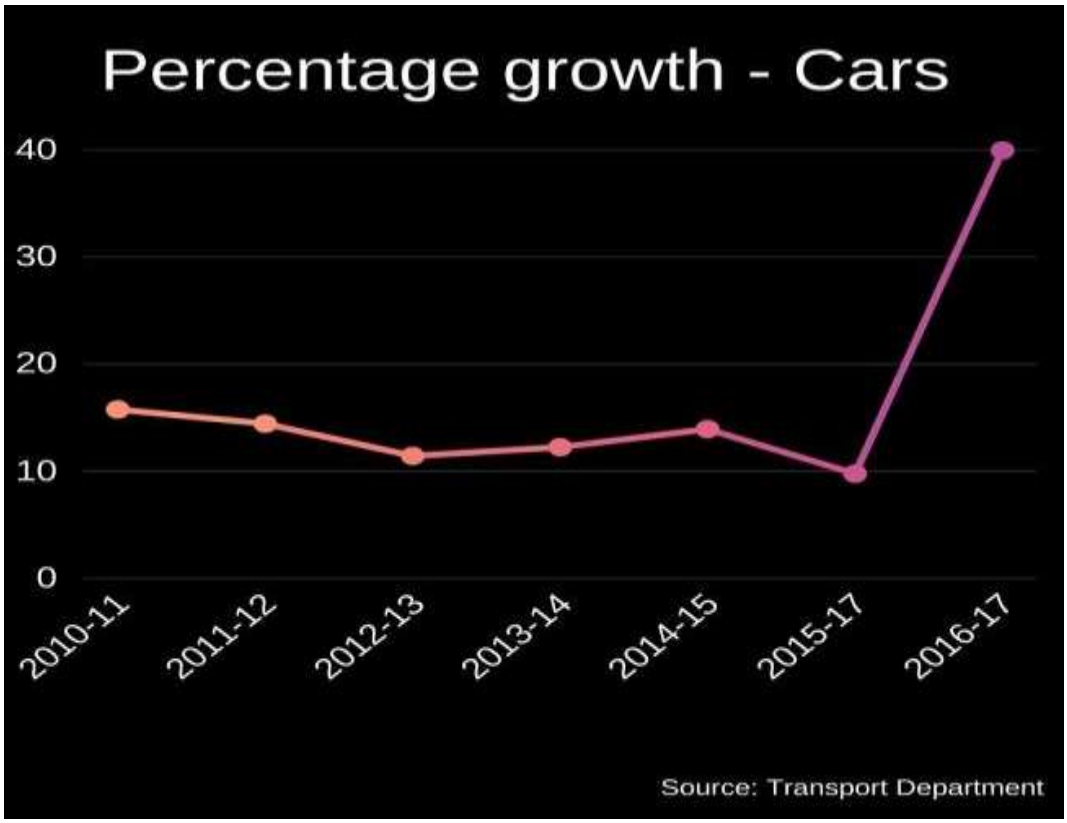
This boom in the number of vehicles in the city is directly linked to the construction of the new Andhra capital Amaravati, say people in the transport department.

E Meera Prasad, Krishna district Deputy Transport Commissioner told TNM, "The shifting of the capital and the construction of the Secretariat has resulted in all-round development. This happened with transportation too. As a result, ownership of the vehicles has gone up."

Speaking about non-transport vehicles, Meera Prasad said that since the land rates have increased in and around Vijayawada, people who sold off their land could have purchased vehicles.




Percentage growth - Motorbikes
80
60
40
20
0
2010-11
2011-12
2012-13
2013-14
2014-15
2015-17
2016-17
Source: Transport Department


Percentage growth - Cars
40
30
20
10
0
2010-11
2011-12
2012-13
2013-14
2014-15
2015-17
2016-17
Source: Transport Department

The swelling strength of Vijayawada's traffic is evident in the city's chaotic traffic jams during peak hours. This is especially prominent on routes that lead to the capital city of Amaravati. The metropolitan areas of Guntur and Vijayawada are closest to Amaravati's border.

While the bifurcation of the state in itself had undeniably created a buzz among the cities in Andhra Pradesh like Vijayawada and Visakhapatnam, Chief Minister N Chandrababu Naidu's indication to shift his administrative base from Hyderabad to Amaravati might have also given impetus for the increase in the number of vehicles.

While transport vehicles include autorickshaws, goods carriages, school and college buses, cabs etc, non-transport vehicles include cars, motorbikes and tractor trailers, among others.

As of January 2016, transport officials in Vijayawada said that a total of 6,80,594 vehicles were plying the roads of the city. In the next year, this number increased to 9,86,870, which is an increase of 45%.

This figure is almost double that of 2010, just four years before the state's bifurcation. In 2010, there were only 4,14,865 vehicles in the city.

However, there is a definite downside to the vehicle boom, say experts.

Earlier this year, it was reported that Vijayawada had the highest level of PM10 in the state with 110 µg/m³, as compared to 90 u µg/m³ in 2011.

The state's Pollution Control Board (PCB) determines the Air Quality Index (AQI) of an area by breaking it down into PM2.5 and PM10 levels, where 'PM' stands for particulate matter, while the accompanying numbers give the size of these particles, which are measured in microns.

The standard values of PM 2.5 and PM 10 that are considered acceptable are 60 and 100 micrograms per cubic metre (µg/m³) respectively.

According to data from the Ambient Air Quality Station at MC Guest House in Vijayawada, as of last month, the air quality index parameters were crossing the standard values every day during peak traffic hours.

Urban development experts feel that a continuous check on the transport system and adopting alternative transport means can reduce the traffic chaos, while also keeping another major issue – pollution – in check.

Toll Road Project Introduction

GVR Infra is examining the financial feasibility of a highway project between Amaravathi to Vijayawada distance of 42.4 kms. The highway is a 6 lane highway which will reduce the travel time from the existing 1 hr 14 minutes to 30 minutes.

An estimated 4 lakhs vehicles will use the highway daily. This number is expected to grow 4% annually. The Land Acquisition cost will be Rs 2.13 cr per acre and 220 acre land will be acquired . 2.13 cr will be the cost to acquire the land and is only 45% of the total project cost

(Source NHAI).

Bidders can collect the toll for 29 years. They can fund the project by securitizing the toll. At the end of the period the government will take over the road. 6% inflation persists. Corporate Tax rate Is 30%

GVR Infrastructures will be given 40 acre of the land for development of civic infrastructure along the highway. A 5 star hotel a tech park, shopping complex and apartment complex will be constructed. This is to enable the financial viability of the whole project. Construction time is 1 year.

Annual Maintenance cost of the Road is Rs 45 lakhs. The funding will be through issuing bonds at 7.85% guaranteed by Government of AP.

Cutting down on driving time will have fuel savings to the tune of Rs 35 per vehicle per trip for large vehicles and Rs 15 per trip for smaller vehicles. Environmental impact of lower carbon emission has not been quantified.

Vijayawada GDP $3 billion (2010) is estimated to increase to $17 billion in 2025 and this highway is expected to impact the GDP by 1 ½%. Take USD/INR t 67 for this forecast. Depreciation on RCC Roads as per Companies act 2013 is 9.5%

Govt will fund the land GVR has to fund the road construction.

The AP govt promoted AMVI Ltd to manage this entire project on its behalf and the MD Mr. Guruswamy of AMVI Ltd hired a Project Finance consultant Mr Holla to Provide answers to the following questions.

Question

Mr Holla was to Consider all the information provided and work out the

a) Initial cost to construct the road

b) Total Funding required

c) Annual Toll to be collected to earn a minimum return of 14% for GVR Infra.

d) Price the toll for 2 wheeler, 4 wheeler Private Vehicle, 4 wheeler Commercial Vehicle, Bus and Lorry in the Proportion of 1: 2.25: 3: 5: 4

e) Show how your Pricing Mechanism if fair to the Contractor and the Public (Govt)

Solution

The consultant Mr Holla filed his estimation (SEE EXHIBIT 1) . Immediately Guruswamy the MD of AMVI noticed some glaring drawbacks in Estimation of Social Benefits that would accrue to the Project. The Tax to GDP ratio as per the latest Andhra Pradesh budget

was 7.6%. The increased GDP of Vijayawada would only yield so much incremental tax to the exchequer. He noticed that since there was no tax breaks provided for the project the road would provide tax revenue to the Government which ought to be shown in the estimation. He believed these would have an enormous impact on the end toll they would need to collect.

He noticed the IRR for both the parties was very high and was open to reducing the toll to being down the IRR to about 50% thereby leaving significant room for uncertainties to play.

Further he wanted to compute the IRR based solely upon the cash inflow to AMVI and was open to incorporating tax revenues of AP govt with increased GDP of Vijayawada and also the tax paid by the toll road to the Government in the estimation.

Guruswamy wanted to keep the toll affordable so that there would not be political backlash for the government and utilization rate of the road would be higher thn anticipated.

He mentioned his concerns to the Project Finance Consultant who then revised his estimates (SEE Exhibit 2)

Guruswamy took the workings finalized in Exhibit 2 to the Ministry and was told that the funding for the project would have to be raised by selling equity shares to LIC. The government would not provide any budgetary support for this project.

He was asked to Price the issue. He returned to his office wondering what would be the dividends AMVI Ltd could pay each year to the shareholders. He wanted to raise Rs 500 cr and the face value would be Rs 10. He was positive that 50% of the Cash AMVI Ltd received could be used to pay the dividends.

Mr Holla worked out the Discounted Cash Flow and the Terminal Cash flow for the shareholders. The shareholder's would be requiring 12% rate of return to invest in this project. His workings on the Value of shares being sold Is Provided in Exhibit 3. LIC observed that the intrinsic value per share was Rs 13.89 and they were buying it at a discount at only Rs 10/-

In the final meeting before the official launch of the Project GVR Infra CFO Mr Ashok met with Mr Gurumurthy and Mr Holla and understood from their perspective the challenges they were facing.

Ashok told them both " We are carrying the debt burden for 29 years an paying interest on it to the Banks, I will explore the possibility of a sinking fund to repay the borrowing earlier this way we may be able to charge even lower toll or at least increase the toll at a lower rate. "

At a Subsequent meeting with the lender consortium he proposed a 5% sinking fund payment where in each year 5% of the borrowing would be repaid. The lender consortium thought that this reduced their risk to the project considerably and assured of 50 basis point

reduction in the interest rate on the loan.

The new repayment schedule provided in Exhibit 4. It shows the interest outflow and the Principal repayment via a sinking fund.

Exhibit 6 Provides the Balance Sheet of both GVR Infra and AMVI Ltd for 29 years.

All the Exhibits 1, 2,3,4,5, and 6 were presented to NHAI for the final approval. NHAI noted that the lion's share of the Project Earning was getting accrued to the Contractor. NHAI objected to such a sharing and proposed a new revenue sharing arrangement of 65:35 between GVR Infra and AMVI Ltd. It gave the parties a month to rework the financials and appraise it. Exhibit 7 and 8 provide the final workings provided to NHAI.

Below is the Exhibit 1 and the accompanying toll collection for Years 1 and Year 2 Petrol Savings for Year 1 and 2

Category	Proportio	Mechanis	Vehicles Y1	Toll per Y1	Petrol Saving Y1	Vehicles Y2	Toll Per Y2	Petro Saving Y2
2 wheeler	0.2	1	0.0083	17.65	15	0.0087	18.709	15.9
4 wheeler	0.3	2.25	0.0125	39.7125	25	0.0130	42.09525	26.5
4 wheeler	0.15	3	0.0062	52.95	25	0.0065	56.127	26.5
Bus	0.25	5	0.0104	88.25	35	0.0108	93.545	37.1
Lorry	0.1	4	0.0042	70.6	35	0.0043	74.836	37.1
Total per day			0.0416	2.18436	1.1024	0.043264	2.408043	1.21529
Total Per Annum				786.37	396.86		866.90	437.50
YoY Growth Rate							10.24%	10.24%

Exhibit 1: Preliminary Estimate of Mr Holla:

Inputs																				
Initial Cost to construct the Road		Yr	Vehicles	Maintenance	Interest	Opex	Toll	Depreciation	Net Profit	Road CFAT	H,TP,SC,AC	SCBA USD Billion	SCBA INR or GDP	Petrol Saving	Carbon Emission	Total SB	Total SB Net Toll
Distance	42.4	0	4	0.450						(572.73)							(468.60)
Land	220 @ 2.13 468.6	1	4.16	0.48	44.96	15.73	786.37	54.41	469.56	501.03		$ 0.12	791	396.86		1,189	402
Construction	572.733	2	4.33	0.51	44.96	17.34	866.90	54.41	524.78	556.25		$ 0.14	882	437.50		1,319	452
Total Cost	1041.33	3	4.50	0.54	44.96	19.11	955.67	54.41	585.65	617.12		$ 0.15	981	482.30		1,464	508
Cost per kms	24.56	4	4.68	0.57	44.96	21.07	1,053.53	54.41	652.76	684.23		$ 0.17	1,093	531.69		1,624	571
Annual maintenance	0.45	5	4.87	0.60	44.96	23.23	1,161.41	54.41	726.74	758.22		$ 0.19	1,216	586.14		1,802	641
n	29	6	5.06	0.64	44.96	25.61	1,280.33	54.41	808.30	839.78		$ 0.21	1,354	646.16		2,000	720
Annual Maintenance per kms	0.011	7	5.26	0.68	44.96	28.23	1,411.44	54.41	898.22	929.69		$ 0.23	1,508	712.32		2,220	808
Vehicles	0.04	8	5.47	0.72	44.96	31.12	1,555.97	54.41	997.34	1,028.81		$ 0.26	1,678	785.26		2,464	908
Growth rate	4%	9	5.69	0.76	44.96	34.31	1,715.30	54.41	1,106.61	1,138.08		$ 0.29	1,868	865.68		2,734	1,019
Inflation	6%	10	5.92	0.81	44.96	37.82	1,890.95	54.41	1,227.07	1,258.54		$ 0.32	2,080	954.32		3,034	1,143
Interest on Loan	7.85%	11	6.16	0.85	44.96	41.69	2,084.58	28.64	1,377.91	1,409.38		$ 0.36	2,316	1,052.04		3,368	1,283
Toll for 2 wheeler	17.65	12	6.40	0.91	44.96	45.96	2,298.05		1,544.35	1,575.83		$ 0.40	2,578	1,159.77		3,738	1,440
Tax	30%	13	6.66	0.96	44.96	50.67	2,533.37		1,705.75	1,737.22		$ 0.44	2,870	1,278.53		4,148	1,615
GDP 2010	$ 3.00	14	6.93	1.02	44.96	55.86	2,792.78		1,883.67	1,915.14		$ 0.49	3,195	1,409.46		4,604	1,811
GDP 2025	15	15	7.20	1.08	44.96	61.58	3,078.76		2,079.81	2,111.28		$ 0.55	3,557	1,553.78		5,110	2,032
CAGR	11.33%	16	7.49	1.14	44.96	67.88	3,394.03		2,296.03	2,327.50		$ 0.61	3,959	1,712.89		5,672	2,278
Add:	1.50%	17	7.79	1.21	44.96	74.83	3,741.58		2,534.40	2,565.87		$ 0.68	4,408	1,888.29		6,296	2,555
GDP 2019	9 $ 7.88	18	8.10	1.28	44.96	82.49	4,124.72		2,797.18	2,828.66		$ 0.75	4,907	2,081.65		6,989	2,864
Add	$ 0.12	19	8.43	1.36	44.96	90.94	4,547.09		3,086.88	3,118.35		$ 0.84	5,463	2,294.81		7,758	3,211
1 billion USD =	6700	20	8.76	1.44	44.96	100.25	5,012.71		3,406.24	3,437.71		$ 0.94	6,082	2,529.80		8,612	3,599
GDP bump in INR in Y1	791.90	21	9.12	1.53	44.96	110.52	5,526.01		3,758.30	3,789.77		$ 1.04	6,771	2,788.85		9,559	4,033
		22	9.48	1.62	44.96	121.84	6,091.87		4,146.42	4,177.89		$ 1.16	7,538	3,074.43		10,612	4,520
		23	9.86	1.72	44.96	134.31	6,715.68		4,574.28	4,605.75		$ 1.29	8,391	3,389.25		11,780	5,065
		24	10.25	1.82	44.96	148.07	7,403.37		5,045.96	5,077.43		$ 1.44	9,342	3,736.31		13,078	5,675
		25	10.66	1.93	44.96	163.23	8,161.47		5,565.95	5,597.42		$ 1.60	10,400	4,118.91		14,519	6,357
		26	11.09	2.05	44.96	179.94	8,997.21		6,139.18	6,170.65		$ 1.78	11,578	4,540.69		16,118	7,121
		27	11.53	2.17	44.96	198.37	9,918.52		6,771.11	6,802.58		$ 1.98	12,889	5,005.66		17,895	7,976
		28	11.99	2.30	44.96	218.68	10,934.18		7,467.76	7,499.23		$ 2.21	14,349	5,518.24		19,867	8,933
		29	12.47	2.44	44.96	241.08	12,053.83		8,235.75	7,694.49		$ 2.46	15,974	6,083.30		22,057	10,003
								572.73	Value for GVR	98.42%				Value for the Govt and Public			98.22%

Exhibit 2: AMVI Ltd only takes Tax as a Proportion of GDP and the Income Tax GRV Infra Pays the Government together with Dividends received in calculation of IRR.

			Inputs
Initial Cost to construct the Road			
Distance	42.4		
Land	220 @	2.13	468.60
Construction			572.73
Total Cost			1,041.33
Cost per kms			24.56
Annual maintenance			0.45
n			29
Annual Maintenance per kms			0.011
Vehicles			0.04
Growth rate			4%
Inflation			6%
Interest on Loan			7.85%
Toll for 2 wheeler			9
Tax			30%
AP Tax to GDP			7.60%
Dividend Payout Ratio			19%
Diviend Payout to Shareholders			50%
Required Rate of Return			12%
Terminal Growth Rate			4%
GDP	2010		$ 3.00
GDP	2025		15
CAGR			11.33%
Add:			1.50%
GDP	2019	9	$ 7.88
		Add	$ 0.12
1 billion USD =			6700
GDP bump in INR in Y1			791.90

Yr	Vehicles	Maintenance	Interest	Opex	Toll	Depreciation	Net Profit	Dividend to Govt	Road CFAT	H,TP,SC,AC	SCBA USD Billion	SCBA INR or GDP	Tax on Inc GDP	Tax Collect from road	Petrol Saving	Dividend	Carbon Emission	Total SB	Cash plus Tax Inflow to Govt
0	4	0.450							(572.73)										(468.60)
1	4.16	0.48	44.96	8.02	400.98	54.41	205.18	38.98	252.08		$ 0.12	792	60	90	396.86	38.98		586	190
2	4.33	0.51	44.96	8.84	442.04	54.41	233.33	44.33	274.88		$ 0.14	882	67	103	437.50	44.33		651	214
3	4.50	0.54	44.96	9.75	487.31	54.41	264.36	50.23	300.01		$ 0.15	981	75	116	482.30	50.23		723	241
4	4.68	0.57	44.96	10.74	537.21	54.41	298.57	56.73	327.72		$ 0.17	1,093	83	131	531.69	56.73		803	271
5	4.87	0.60	44.96	11.84	592.22	54.41	336.28	63.89	358.27		$ 0.19	1,216	92	148	586.14	63.89		890	304
6	5.06	0.64	44.96	13.06	652.86	54.41	377.86	71.79	391.95		$ 0.21	1,354	103	166	646.16	71.79		987	341
7	5.26	0.68	44.96	14.39	719.71	54.41	423.69	80.50	429.07		$ 0.23	1,508	115	186	712.32	80.50		1,093	381
8	5.47	0.72	44.96	15.87	793.41	54.41	474.22	90.10	470.00		$ 0.26	1,678	128	208	785.26	90.10		1,211	426
9	5.69	0.76	44.96	17.49	874.66	54.41	529.93	100.69	515.12		$ 0.29	1,868	142	232	865.68	100.69		1,341	475
10	5.92	0.81	44.96	19.28	964.22	54.41	591.34	112.35	564.86		$ 0.32	2,080	158	259	954.32	112.35		1,484	530
11	6.16	0.85	44.96	21.26	1,062.96	28.64	677.08	128.64	608.54		$ 0.36	2,316	176	297	1,052.04	128.64		1,653	601
12	6.40	0.91	44.96	23.44	1,171.81		771.75	146.63	656.59		$ 0.40	2,578	196	338	1,159.77	146.63		1,840	680
13	6.66	0.96	44.96	25.84	1,291.80		854.03	162.27	723.24		$ 0.44	2,870	218	374	1,278.53	162.27		2,033	754
14	6.93	1.02	44.96	28.48	1,424.08		944.74	179.50	796.71		$ 0.49	3,195	243	413	1,409.46	179.50		2,245	836
15	7.20	1.08	44.96	31.40	1,569.91		1,044.73	198.50	877.70		$ 0.55	3,557	270	457	1,553.78	198.50		2,480	926
16	7.49	1.14	44.96	34.61	1,730.67		1,154.97	219.44	966.99		$ 0.61	3,959	301	505	1,712.89	219.44		2,739	1,026
17	7.79	1.21	44.96	38.16	1,907.89		1,276.49	242.53	1,065.43		$ 0.68	4,408	335	559	1,888.29	242.53		3,024	1,136
18	8.10	1.28	44.96	42.07	2,103.25		1,410.46	267.99	1,173.95		$ 0.75	4,907	373	617	2,081.65	267.99		3,340	1,258
19	8.43	1.36	44.96	46.37	2,318.63		1,558.15	296.05	1,293.58		$ 0.84	5,463	415	682	2,294.81	296.05		3,688	1,393
20	8.76	1.44	44.96	51.12	2,556.06		1,720.97	326.98	1,425.46		$ 0.94	6,082	462	753	2,529.80	326.98		4,072	1,542
21	9.12	1.53	44.96	56.36	2,817.80		1,900.46	361.09	1,570.85		$ 1.04	6,771	515	831	2,788.85	361.09		4,496	1,707
22	9.48	1.62	44.96	62.13	3,106.34		2,098.34	398.68	1,731.13		$ 1.16	7,538	573	918	3,074.43	398.68		4,964	1,889
23	9.86	1.72	44.96	68.49	3,424.43		2,316.48	440.13	1,907.82		$ 1.29	8,391	638	1,013	3,389.25	440.13		5,480	2,091
24	10.25	1.82	44.96	75.50	3,775.09		2,556.96	485.82	2,102.61		$ 1.44	9,342	710	1,118	3,736.31	485.82		6,051	2,314
25	10.66	1.93	44.96	83.23	4,161.66		2,822.07	536.19	2,317.35		$ 1.60	10,400	790	1,234	4,118.91	536.19		6,680	2,561
26	11.09	2.05	44.96	91.76	4,587.81		3,114.33	591.72	2,554.08		$ 1.78	11,578	880	1,362	4,540.69	591.72		7,375	2,834
27	11.53	2.17	44.96	101.15	5,057.60		3,436.52	652.94	2,815.06		$ 1.98	12,889	980	1,503	5,005.66	652.94		8,141	3,136
28	11.99	2.30	44.96	111.51	5,575.50		3,791.71	720.43	3,102.76		$ 2.21	14,349	1,091	1,658	5,518.24	720.43		8,988	3,469
29	12.47	2.44	44.96	122.93	6,146.43		4,183.27	794.82	3,419.92		$ 2.46	15,974	1,214	1,830	6,083.30	794.82		9,922	3,839
						572.73	Value for GVR		53.22%			Value for the Govt and Public							52.84%

Yr	Dividend Cash Flow To Sh holders Exhibit 3	
0		DCF
1	19.49	17.40
2	22.17	17.67
3	25.11	17.88
4	28.36	18.03
5	31.95	18.13
6	35.90	18.19
7	40.25	18.21
8	45.05	18.20
9	50.34	18.15
10	56.18	18.09
11	64.32	18.49
12	73.32	18.82
13	81.13	18.59
14	89.75	18.36
15	99.25	18.13
16	109.72	17.90
17	121.27	17.66
18	133.99	17.42
19	148.02	17.19
20	163.49	16.95
21	180.54	16.71
22	199.34	16.47
23	220.07	16.24
24	242.91	16.00
25	268.10	15.77
26	295.86	15.54
27	326.47	15.31
28	360.21	15.08
29	397.41	207.99
	Value of Shares	694.57
	Equity Funding	500.00
	Face value	10
	No of Sh o/s	50.00
		13.89

In the above Exhibit 3 we provide the value of the Project from the Perspective of Equity Shareholders. Value of Any asset in finance is the Present Value of its future Cash Flow. Since we have clarity for 29 years it is explicitly forecasted and then a terminal Value is obtained. Sum of this Discounted Cash Flow is the Value of the shares. 50 cr shares of Face Value of Rs 10 is being issues to LIC at face Value. Thus there is Value for LIC in this deal. Each year LIC will receive Dividends on its investment. This will be paid by AMVI Ltd out of the Toll shared by GVR Ltd.

Exhibit 4 : New Repayment Schedule using Sinking Fund and Consequent New Interest Rate.

GVR Ltd's Loan		Year	Repaid	Balance o/s	Interest
Loan	572.73	1	28.64	544.10	42.10
Interest	7.3500%	2	27.20	516.89	39.99
Repaid	5%	3	25.84	491.05	37.99
		4	24.55	466.49	36.09
		5	23.32	443.17	34.29
		6	22.16	421.01	32.57
		7	21.05	399.96	30.94
		8	20.00	379.96	29.40
		9	19.00	360.96	27.93
		10	18.05	342.92	26.53
		11	17.15	325.77	25.20
		12	16.29	309.48	23.94
		13	15.47	294.01	22.75
		14	14.70	279.31	21.61
		15	13.97	265.34	20.53
		16	13.27	252.08	19.50
		17	12.60	239.47	18.53
		18	11.97	227.50	17.60
		19	11.37	216.12	16.72
		20	10.81	205.32	15.89
		21	10.27	195.05	15.09
		22	9.75	185.30	14.34
		23	9.26	176.03	13.62
		24	8.80	167.23	12.94
		25	8.36	158.87	12.29
		26	7.94	150.93	11.68
		27	7.55	143.38	11.09
		28	7.17	136.21	10.54
		29	6.81	129.40	10.01
			443.33		

Next We look at Exhibit 5 after the new terms of the loan of GVR Infra has been incorporated. This allows GVR to pass on more dividends to AMVI Ltd and consequently the Value of the Shares of AMVI Ltd increases due to increased dividends.

Yr	Vehicles	Maintenance	Interest	Opex	Toll	Depreciation	Net Profit	Dividend to Gov	Road CFAT	H,TP,SC,A(	SCBA USD Billi	SCBA INR cr GDP	Tax on Inc GDP	Tax Collecte from road	Petrol Saving	Dividend	Carbon Emission	Total SB	Cash plus Tax Inflow to Govt
0	4	0.450							(572.73)										(468.60)
1	4.16	0.48	42.10	8.02	400.98	54.41	207.19	39.37	223.06		$ 0.12	792	60	91	396.86	39.37	588	191	
2	4.33	0.51	39.99	8.84	442.04	54.41	236.81	44.99	247.01		$ 0.14	882	67	104	437.50	44.99	654	216	
3	4.50	0.54	37.99	9.75	487.31	54.41	269.24	51.16	273.24		$ 0.15	981	75	118	482.30	51.16	726	244	
4	4.68	0.57	36.09	10.74	537.21	54.41	304.78	57.91	301.99		$ 0.17	1,093	83	134	531.69	57.91	806	275	
5	4.87	0.60	34.29	11.84	592.22	54.41	343.75	65.31	333.53		$ 0.19	1,216	92	151	586.14	65.31	895	309	
6	5.06	0.64	32.57	13.06	652.86	54.41	386.53	73.44	368.14		$ 0.21	1,354	103	170	646.16	73.44	992	346	
7	5.26	0.68	30.94	14.39	719.71	54.41	433.50	82.37	406.16		$ 0.23	1,508	115	190	712.32	82.37	1,099	387	
8	5.47	0.72	29.40	15.87	793.41	54.41	485.12	92.17	447.93		$ 0.26	1,678	128	213	785.26	92.17	1,218	432	
9	5.69	0.76	27.93	17.49	874.66	54.41	541.85	102.95	493.86		$ 0.29	1,868	142	237	865.68	102.95	1,348	482	
10	5.92	0.81	26.53	19.28	964.22	54.41	604.24	114.80	544.36		$ 0.32	2,080	158	265	954.32	114.80	1,492	538	
11	6.16	0.85	25.20	21.26	1,062.96	28.64	690.90	131.27	588.77		$ 0.36	2,316	176	302	1,052.04	131.27	1,662	610	
12	6.40	0.91	23.94	23.44	1,171.81		786.47	149.43	637.51		$ 0.40	2,578	196	344	1,159.77	149.43	1,849	689	
13	6.66	0.96	22.75	25.84	1,291.80		869.58	165.22	704.81		$ 0.44	2,870	218	380	1,278.53	165.22	2,042	764	
14	6.93	1.02	21.61	28.48	1,424.08		961.08	182.61	778.90		$ 0.49	3,195	243	420	1,409.46	182.61	2,255	846	
15	7.20	1.08	20.53	31.40	1,569.91		1,061.83	201.75	860.49		$ 0.55	3,557	270	464	1,553.78	201.75	2,490	937	
16	7.49	1.14	19.50	34.61	1,730.67		1,172.79	222.83	950.34		$ 0.61	3,959	301	513	1,712.89	222.83	2,750	1,037	
17	7.79	1.21	18.53	38.16	1,907.89		1,294.99	246.05	1,049.31		$ 0.68	4,408	335	566	1,888.29	246.05	3,036	1,147	
18	8.10	1.28	17.60	42.07	2,103.25		1,429.61	271.63	1,158.33		$ 0.75	4,907	373	625	2,081.65	271.63	3,352	1,270	
19	8.43	1.36	16.72	46.37	2,318.63		1,577.92	299.80	1,278.45		$ 0.84	5,463	415	690	2,294.81	299.80	3,700	1,405	
20	8.76	1.44	15.89	51.12	2,556.06		1,741.32	330.85	1,410.79		$ 0.94	6,082	462	762	2,529.80	330.85	4,084	1,555	
21	9.12	1.53	15.09	56.36	2,817.80		1,921.37	365.06	1,556.61		$ 1.04	6,771	515	840	2,788.85	365.06	4,509	1,720	
22	9.48	1.62	14.34	62.13	3,106.34		2,119.78	402.76	1,717.30		$ 1.16	7,538	573	927	3,074.43	402.76	4,977	1,903	
23	9.86	1.72	13.62	68.49	3,424.43		2,338.42	444.30	1,894.39		$ 1.29	8,391	638	1,023	3,389.25	444.30	5,494	2,105	
24	10.25	1.82	12.94	75.50	3,775.09		2,579.38	490.08	2,089.55		$ 1.44	9,342	710	1,128	3,736.31	490.08	6,064	2,328	
25	10.66	1.93	12.29	83.23	4,161.66		2,844.94	540.54	2,304.64		$ 1.60	10,400	790	1,244	4,118.91	540.54	6,694	2,575	
26	11.09	2.05	11.68	91.76	4,587.81		3,137.63	596.15	2,541.71		$ 1.78	11,578	880	1,372	4,540.69	596.15	7,389	2,848	
27	11.53	2.17	11.09	101.15	5,057.60		3,460.23	657.44	2,803.01		$ 1.98	12,889	980	1,513	5,005.66	657.44	8,156	3,150	
28	11.99	2.30	10.54	111.51	5,575.50		3,815.81	725.00	3,091.01		$ 2.21	14,349	1,091	1,669	5,518.24	725.00	9,003	3,484	
29	12.47	2.44	10.01	122.93	6,146.43		4,207.74	799.47	3,408.46		$ 2.46	15,974	1,214	1,840	6,083.30	799.47	9,937	3,854	
						572.73	Value for GVR		49.41%					Value for the Govt and Public					53.31%

	Dividend Cash Flow		
Yr	To Sh holders Exhibit 3		
0		DCF	
1	19.68	17.57	
2	22.50	17.93	
3	25.58	18.21	
4	28.95	18.40	
5	32.66	18.53	
6	36.72	18.60	
7	41.18	18.63	
8	46.09	18.61	
9	51.48	18.56	
10	57.40	18.48	
11	65.64	18.87	
12	74.71	19.18	
13	82.61	18.93	
14	91.30	18.68	
15	100.87	18.43	
16	111.41	18.17	
17	123.02	17.92	
18	135.81	17.66	
19	149.90	17.40	
20	165.43	17.15	
21	182.53	16.89	
22	201.38	16.64	
23	222.15	16.39	
24	245.04	16.14	
25	270.27	15.90	
26	298.07	15.66	
27	328.72	15.41	
28	362.50	15.18	
29	399.74	209.21	
	Value of Shares	703.36	
	Equity Funding	500.00	cr
	Face value	10	rs
	No of Sh o/s	50.00	cr
		14.07	

As the dividends distributed to the shareholders increases the value of the shares increase. The MD of GVR created a sinking fund which increased the security for the lenders. They know that 5% of the bonds will be repaid each year. Such a commitment requires discipline. At the end of the 29 years the final payment is made and all outstanding bonds are repaid. This ensured that the loan was obtained at a lower interest rate.

This exhibit 6 Provides the Balance Sheet of both the parties and the Graph shows how skewed the deal is in favor of GVR Infra.

Yr	GVR Project Balance Sheet						AMVI Ltd Project Balance Sheet					
	Reserves	Debt	Capital	NBFA	Cash	Net Assets	Sh Capital	Reserves	Capital	NBFA	Cash	Net Assets
0	-	573	573	573	-	573	500	-	500	469	31	500
1	168	544	712	518	194	712	500	20	520	469	51	520
2	360	517	877	464	413	877	500	42	542	469	74	542
3	578	491	1,069	410	659	1,069	500	68	568	469	99	568
4	825	466	1,291	355	936	1,291	500	97	597	469	128	597
5	1,103	443	1,546	301	1,246	1,546	500	129	629	469	161	629
6	1,416	421	1,837	246	1,591	1,837	500	166	666	469	197	666
7	1,767	400	2,167	192	1,975	2,167	500	207	707	469	239	707
8	2,160	380	2,540	137	2,403	2,540	500	253	753	469	285	753
9	2,599	361	2,960	83	2,877	2,960	500	305	805	469	336	805
10	3,089	343	3,431	29	3,403	3,431	500	362	862	469	394	862
11	3,648	326	3,974	(0)	3,974	3,974	500	428	928	469	459	928
12	4,285	309	4,595	(0)	4,595	4,595	500	503	1,003	469	534	1,003
13	4,990	294	5,284	(0)	5,284	5,284	500	585	1,085	469	617	1,085
14	5,768	279	6,047	(0)	6,047	6,047	500	676	1,176	469	708	1,176
15	6,628	265	6,893	(0)	6,893	6,893	500	777	1,277	469	809	1,277
16	7,578	252	7,830	(0)	7,830	7,830	500	889	1,389	469	920	1,389
17	8,627	239	8,866	(0)	8,866	8,866	500	1,012	1,512	469	1,043	1,512
18	9,785	227	10,012	(0)	10,012	10,012	500	1,148	1,648	469	1,179	1,648
19	11,063	216	11,279	(0)	11,279	11,279	500	1,298	1,798	469	1,329	1,798
20	12,474	205	12,679	(0)	12,679	12,679	500	1,463	1,963	469	1,494	1,963
21	14,030	195	14,225	(0)	14,225	14,225	500	1,645	2,145	469	1,677	2,145
22	15,747	185	15,932	(0)	15,932	15,932	500	1,847	2,347	469	1,878	2,347
23	17,641	176	17,817	(0)	17,817	17,817	500	2,069	2,569	469	2,100	2,569
24	19,730	167	19,898	(0)	19,898	19,898	500	2,314	2,814	469	2,345	2,814
25	22,035	159	22,194	(0)	22,194	22,194	500	2,584	3,084	469	2,616	3,084
26	24,576	151	24,727	(0)	24,727	24,727	500	2,882	3,382	469	2,914	3,382
27	27,379	143	27,522	(0)	27,522	27,522	500	3,211	3,711	469	3,243	3,711
28	30,470	136	30,606	(0)	30,606	30,606	500	3,574	4,074	469	3,605	4,074
29	33,878	129	34,007	(0)	34,007	34,007	500	3,973	4,473	469	4,005	4,473

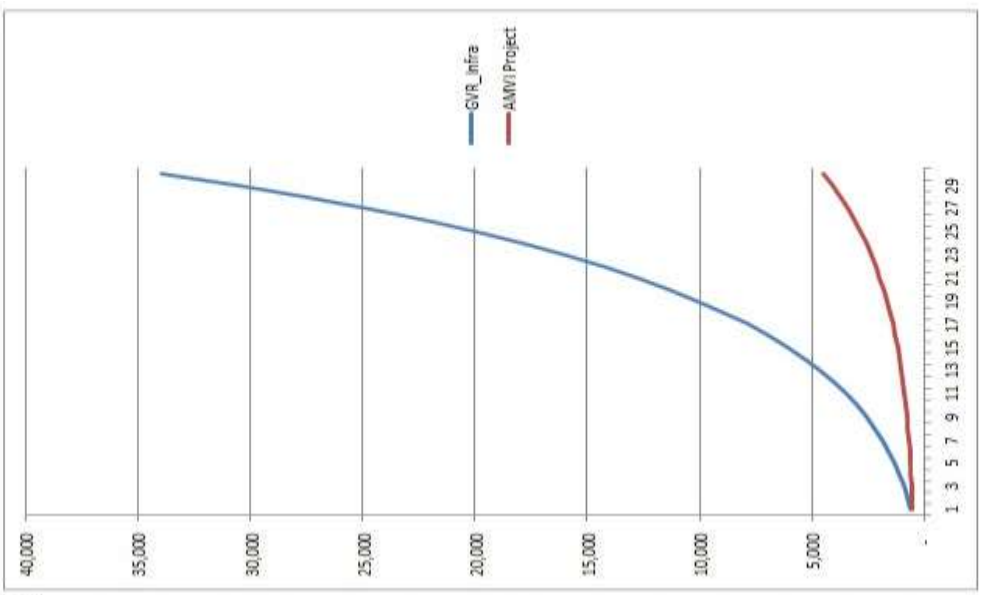
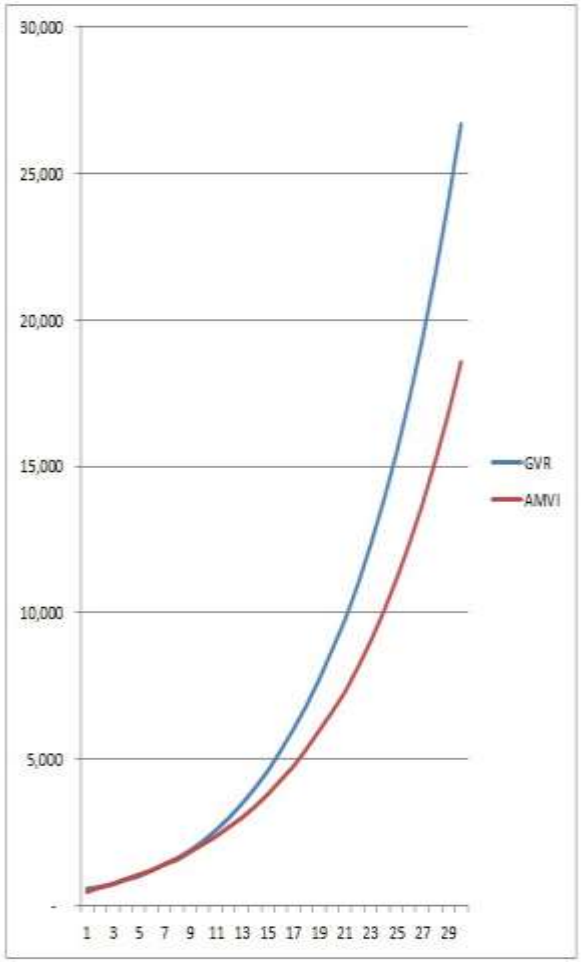


Exhibit 7: Toll Sharing as per NHAI formula of 65% 35%

									Road	H,TP,SC,AC	SCBA USD Billion	SCBA INR cr GDP	Tax on Inc GDP	Tax Collecte from road	Petrol Saving	Share of Toll	Carbon Emission	Total SB	Cash plus Tax Inflow to Govt
Yr	Vehicles	Maintenance	Interest	Opex	Toll	YR Share of T	Depreciation	Net Profit	CFAT										
0	4	0.450							(572.73)										(468.60)
1	4.16	0.48	42.10	8.02	400.98	260.64	54.41	108.95	164.19		$ 0.12	792	60	91	396.86	140.34	689		140
2	4.33	0.51	39.99	8.84	442.04	287.33	54.41	128.51	183.71		$ 0.14	882	67	104	437.50	154.72	763		155
3	4.50	0.54	37.99	9.75	487.31	316.75	54.41	149.85	205.01		$ 0.15	981	75	118	482.30	170.56	846		171
4	4.68	0.57	36.09	10.74	537.21	349.19	54.41	173.16	228.28		$ 0.17	1,093	83	134	531.69	188.02	937		188
5	4.87	0.60	34.29	11.84	592.22	384.94	54.41	198.66	253.75		$ 0.19	1,216	92	151	586.14	207.28	1,037		207
6	5.06	0.64	32.57	13.06	652.86	424.36	54.41	226.58	281.63		$ 0.21	1,354	103	170	646.16	228.50	1,147		229
7	5.26	0.68	30.94	14.39	719.71	467.81	54.41	257.17	312.19		$ 0.23	1,508	115	190	712.32	251.90	1,269		252
8	5.47	0.72	29.40	15.87	793.41	515.72	54.41	290.73	345.72		$ 0.26	1,678	128	213	785.26	277.69	1,403		278
9	5.69	0.76	27.93	17.49	874.66	568.53	54.41	327.56	382.52		$ 0.29	1,868	142	237	865.68	306.13	1,551		306
10	5.92	0.81	26.53	19.28	964.22	626.75	54.41	368.00	422.93		$ 0.32	2,080	158	265	954.32	337.48	1,715		337
11	6.16	0.85	25.20	21.26	1,062.96	690.92	28.64	430.48	459.61		$ 0.36	2,316	176	302	1,052.04	372.04	1,903		372
12	6.40	0.91	23.94	23.44	1,171.81	761.68		499.37	499.85		$ 0.40	2,578	196	344	1,159.77	410.13	2,110		410
13	6.66	0.96	22.75	25.84	1,291.80	839.67		553.09	553.54		$ 0.44	2,870	218	380	1,278.53	452.13	2,329		452
14	6.93	1.02	21.61	28.48	1,424.08	925.65		612.18	612.61		$ 0.49	3,195	243	420	1,409.46	498.43	2,571		498
15	7.20	1.08	20.53	31.40	1,569.91	1,020.44		677.20	677.61		$ 0.55	3,557	270	464	1,553.78	549.47	2,838		549
16	7.49	1.14	19.50	34.61	1,730.67	1,124.93		748.77	749.16		$ 0.61	3,959	301	513	1,712.89	605.73	3,133		606
17	7.79	1.21	18.53	38.16	1,907.89	1,240.13		827.56	827.93		$ 0.68	4,408	335	566	1,888.29	667.76	3,458		668
18	8.10	1.28	17.60	42.07	2,103.25	1,367.12		914.32	914.66		$ 0.75	4,907	373	625	2,081.65	736.14	3,816		736
19	8.43	1.36	16.72	46.37	2,318.63	1,507.11		1,009.86	1,010.19		$ 0.84	5,463	415	690	2,294.81	811.52	4,212		812
20	8.76	1.44	15.89	51.12	2,556.06	1,661.44		1,115.09	1,115.40		$ 0.94	6,082	462	762	2,529.80	894.62	4,648		895
21	9.12	1.53	15.09	56.36	2,817.80	1,831.57		1,231.01	1,231.31		$ 1.04	6,771	515	840	2,788.85	986.23	5,130		986
22	9.48	1.62	14.34	62.13	3,106.34	2,019.12		1,358.72	1,359.01		$ 1.16	7,538	573	927	3,074.43	1,087.22	5,662		1,087
23	9.86	1.72	13.62	68.49	3,424.43	2,225.88		1,499.44	1,499.70		$ 1.29	8,391	638	1,023	3,389.25	1,198.55	6,248		1,199
24	10.25	1.82	12.94	75.50	3,775.09	2,453.81		1,654.48	1,654.74		$ 1.44	9,342	710	1,128	3,736.31	1,321.28	6,896		1,321
25	10.66	1.93	12.29	83.23	4,161.66	2,705.08		1,825.33	1,825.58		$ 1.60	10,400	790	1,244	4,118.91	1,456.58	7,610		1,457
26	11.09	2.05	11.68	91.76	4,587.81	2,982.08		2,013.62	2,013.85		$ 1.78	11,578	880	1,372	4,540.69	1,605.73	8,399		1,606
27	11.53	2.17	11.09	101.15	5,057.60	3,287.44		2,221.12	2,221.34		$ 1.98	12,889	980	1,513	5,005.66	1,770.16	9,269		1,770
28	11.99	2.30	10.54	111.51	5,575.50	3,624.08		2,449.81	2,450.02		$ 2.21	14,349	1,091	1,669	5,518.24	1,951.43	10,229		1,951
29	12.47	2.44	10.01	122.93	6,146.43	3,995.18		2,701.86	2,702.06		$ 2.46	15,974	1,214	1,840	6,083.30	2,151.25	11,289		2,151
							572.73	Value for GVR	39.79%		Value for the Govt and Public								40.16%

Tax collection kept out of estimation of the IRR for the Government (AMVI Ltd) which works out to 40,16% and 39.79% to GVR Ltd the contractor. In the Final Exhibit 8 the Balance Sheet of both the entities are provided and now the deal looks more balanced.

	GVR Project Balance Sheet						AMVI Ltd Project Balance Sheet					
Yr	Reserves	Debt	Capital	NBFA	Cash	Net Assets	Sh Capital	Reserves	Capital	NBFA	Cash	Net Assets
0	-	573	573	573	-	573	500	-	500	469	31	500
1	109	544	653	518	135	653	500	116	616	469	148	616
2	237	517	754	464	290	754	500	245	745	469	276	745
3	387	491	878	410	469	878	500	386	886	469	418	886
4	560	466	1,027	355	672	1,027	500	543	1,043	469	574	1,043
5	759	443	1,202	301	902	1,202	500	715	1,215	469	746	1,215
6	986	421	1,407	246	1,160	1,407	500	904	1,404	469	936	1,404
7	1,243	400	1,643	192	1,451	1,643	500	1,113	1,613	469	1,145	1,613
8	1,534	380	1,914	137	1,776	1,914	500	1,344	1,844	469	1,375	1,844
9	1,861	361	2,222	83	2,139	2,222	500	1,598	2,098	469	1,629	2,098
10	2,229	343	2,572	29	2,543	2,572	500	1,878	2,378	469	1,909	2,378
11	2,660	326	2,985	(0)	2,985	2,985	500	2,187	2,687	469	2,218	2,687
12	3,159	309	3,468	(0)	3,468	3,468	500	2,527	3,027	469	2,559	3,027
13	3,712	294	4,006	(0)	4,006	4,006	500	2,902	3,402	469	2,934	3,402
14	4,324	279	4,604	(0)	4,604	4,604	500	3,316	3,816	469	3,348	3,816
15	5,001	265	5,267	(0)	5,267	5,267	500	3,772	4,272	469	3,804	4,272
16	5,750	252	6,002	(0)	6,002	6,002	500	4,275	4,775	469	4,306	4,775
17	6,578	239	6,817	(0)	6,817	6,817	500	4,829	5,329	469	4,861	5,329
18	7,492	227	7,720	(0)	7,720	7,720	500	5,440	5,940	469	5,472	5,940
19	8,502	216	8,718	(0)	8,718	8,718	500	6,114	6,614	469	6,145	6,614
20	9,617	205	9,822	(0)	9,822	9,822	500	6,856	7,356	469	6,888	7,356
21	10,848	195	11,043	(0)	11,043	11,043	500	7,675	8,175	469	7,706	8,175
22	12,207	185	12,392	(0)	12,392	12,392	500	8,577	9,077	469	8,609	9,077
23	13,706	176	13,882	(0)	13,882	13,882	500	9,572	10,072	469	9,603	10,072
24	15,361	167	15,528	(0)	15,528	15,528	500	10,669	11,169	469	10,700	11,169
25	17,186	159	17,345	(0)	17,345	17,345	500	11,878	12,378	469	11,909	12,378
26	19,200	151	19,351	(0)	19,351	19,351	500	13,210	13,710	469	13,242	13,710
27	21,421	143	21,564	(0)	21,564	21,564	500	14,680	15,180	469	14,711	15,180
28	23,871	136	24,007	(0)	24,007	24,007	500	16,299	16,799	469	16,331	16,799
29	26,572	129	26,702	(0)	26,702	26,702	500	18,085	18,585	469	18,116	18,585



Teaching Guidelines

This case captures the way group of people working on one project evolve a consensus and arrive at a solution. In real life there are not set solutions but only a framework of reference. Each entity chooses their framework of reference based on their objectives. Uncertainty is a given in any project appraisal. Emergence of ne information will lead to the key decisions being altered. Financial Modelling must be dynamic and fluid to adapt to different inputs. Switching from one preferred instrument to another based on market place reality is commonplace. All these above complexities have been discussed step by step in the above case.

Excel spreadsheet modelling skills are very essential for students participating in this case study discussion. Upon creating the first model the rest are only iteration by altering inputs based on requirements of various parties.

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