A Study of Corruption for Issuing Aadharr Card in India by Using Mathematical Modeling

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ABSTRACT: In this paper we have to study on the problem of 'Corruption' in different ways by using mathematical modeling. The problem of corruption is everywhere, so we will try to find the formula for how to measure the corruption in the society? So, in this connection we have found the formula that is Mathematical corruption model for measuring corruption in the society of the country. Therefore we have taken some illustrations for measuring corruption in the society such as corruption in for issuing aadharr card in India and etc.

KEYWORDS: mathematical thinking, corruption mentality, modeling, applied.

I. INTRODUCTION

The Mathematical results for measuring "corruption" in the society. These mathematical results are as follows:

i. Mathematical Corruption Model (or MC Model) Formula:
$$C = C_0(К + 1)^t$$

ii. Mathematical Corruption-Development Model (or MCD Model) Formula:
$$D(C) = D(0) [1 + К]^C$$

iii. Mathematical E-virus Constant Model with Related Time (MEVC Model) Formula:
$$К = [\frac{C(t)}{C(0)}]^{\frac{1}{t}} - 1 \ , \ -1 < К < 1$$

iv. Mathematical E-virus Constant Model with Related Corruption (MEVC Model) Formula: $К = [\frac{D(C)}{D(0)}]^{\frac{1}{C}} - 1, \ -1 < К < 1$

Note that if the value of К is more than 1 then we choose or take the value approximately to 1 but not equal to 1.

I. Methodology

We have to use the seven steps of mathematical modeling process for solving the problem of corruption in the society of any country of the world. Also we can represent mathematical modeling process in the form "Visual". Therefore it is known as visual mathematical modeling process. It is as follows:
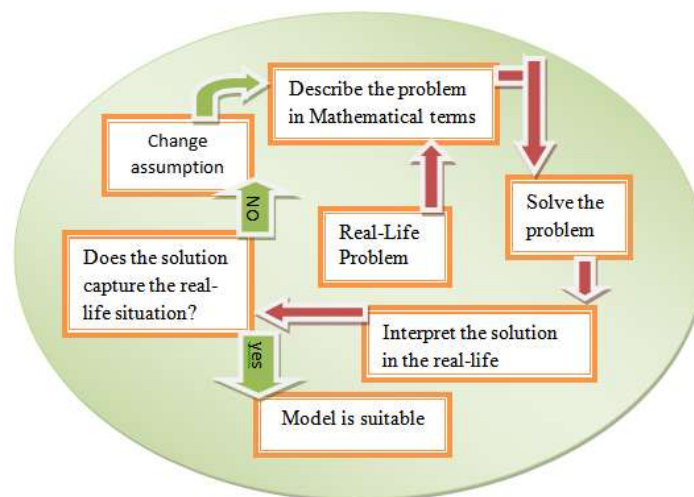

Fig-1: The 'solution plan' for visualizing the process of Mathematical modeling.

Mathematical modeling means "Translation from real world problems into Mathematics world."

II. MATHEMATICAL MODELING IN CORRUPTION FOR ISSUING AADHARR CARD IN INDIA:

The problem of AADHAAR card for issuing to the peoples of India, the planning commission of India has decided to make a 'unique identity' of all Indian peoples. For this purpose they recommended to the government of India for implementing the same work. Therefore the government of India established the attached office of the planning commission through the Indian government notification dated January, 2009. For this notification, it make the authority naming is that 'Unique Identification Authority of India' or UIDAI.

After completing all the formalities that necessary requirements for collecting data and biometric data like finger prints and iris images. Then UIDAI have issued first aadharr number on date 29-09-2010. Also we have observed that up to the end of year 2012, the 25 crore aadharr numbers have issued at the average of one crore per month. Further we have seen that in the next year 2013 the UIDAI have issued 29.10 crore aadharr numbers at average rate 2.4 crore per month and at the end of November 2014, the aadharr numbers have issued 71.62 crore. Also in India, we have seen that aadharr numbers have issued in state-wise as of the following tables:

Table-I: North States in India (November 2014)[14]

Sr. No.	Name of The States	Total Population	Aadharr issued	Percentage of Population
1	Jammu and Kashmir	12,548,926	4,090,191	32.59
2	Himachal Pradesh	6,85,6509	6,509,250	94.94
3	Haryana	25,753,081	19,879,263	77.19
4	Punjab	27,704,236	24,731,444	89.27
5	Uttar Pradesh	199,581,477	59,243,389	29.68
6	Uttarakhand	10,116,752	3,772,549	37.29
7	Jharkhand	32,966,238	26,945,623	81.74
8	Chhattisgarh	25,540,196	8,897,354	34.84
9	Bihar	103,804,637	19,316,022	18.61
10	Chandigarh	1,054,686	960,797	91.10
11	Rajasthan	68,621,012	42,637,042	62.13
12	Delhi	16,753,235	17,336,708	103.48

Table-II: Middle States in India (November 2014)[14]

| Sr. No.	Name of The States	Total Population	Aadharr issued	Percentage of Population
1	Gujarat	60,383,628	36,685,040	60.75
2	Maharashtra	112,372,972	88,330,605	78.60
3	Madhya Pradesh	72,597,565	47,499,427	65.43
4	Goa	1,457,723	1,338,649	91.83
5	Andhra Pradesh	84,665,533	82,702,222	97.68

**Table-III: South States in India (November 2014)[14]**

Sr. No.	Name of The States	Total Population	Aadharr issued	Percentage of Population
1	Karnataka	61,130,704	46,001,142	75.25
2	Tamil Nadu	72,138,958	47,207,207	65.44
3	Kerala	33,387,677	30,747,539	92.09
4	West Bengal	91,347,736	53,169,455	58.21
5	Odisha	41,947,358	23,136,314	55.16

Table-IV: East States in India (November 2014)[14]

| Sr. No.	Name of The States	Total Population	Aadharr issued	Percentage of Population
1	Tripura	3,671,032	3,248,628	88.49
2	Pondicherry	1,244,464	1,153,971	92.73
3	Manipur	2,721,756	1,027,696	37.76
4	Nagaland	1,980,602	8,21,203	41.46
5	Mizoram	1,091,014	1,51,802	13.91
6	Andaman and Nicobar Islands	379,944	166,028	43.70
7	Dadra and Nagar Haveli	342,853	222,032	64.76
8	Sikkim	607688	558,182	91.85
9	Daman and Diu	242,911	164,932	67.90
10	Arunachal Pradesh	1,382,611	44,399	3.21
11	Assam	31,169,272	148,948	0.48
12	Meghalaya	2,964,007	17,927	0.60
13	Lakshadweep	64,429	55,490	86.13

**Graph-I**
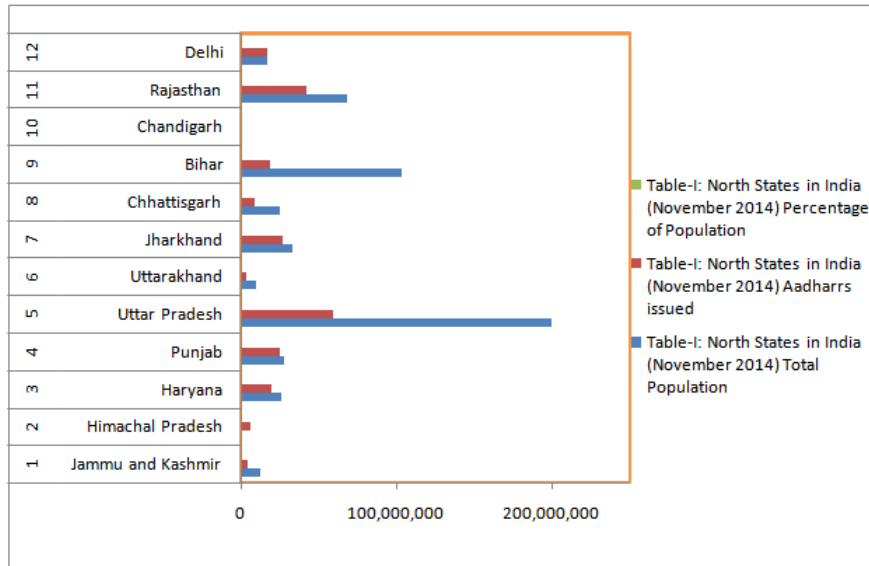
Graph-II
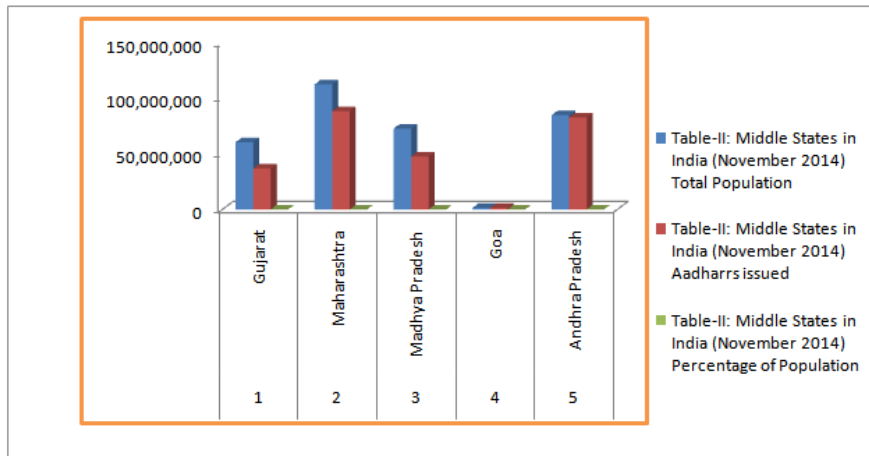
Graph-III
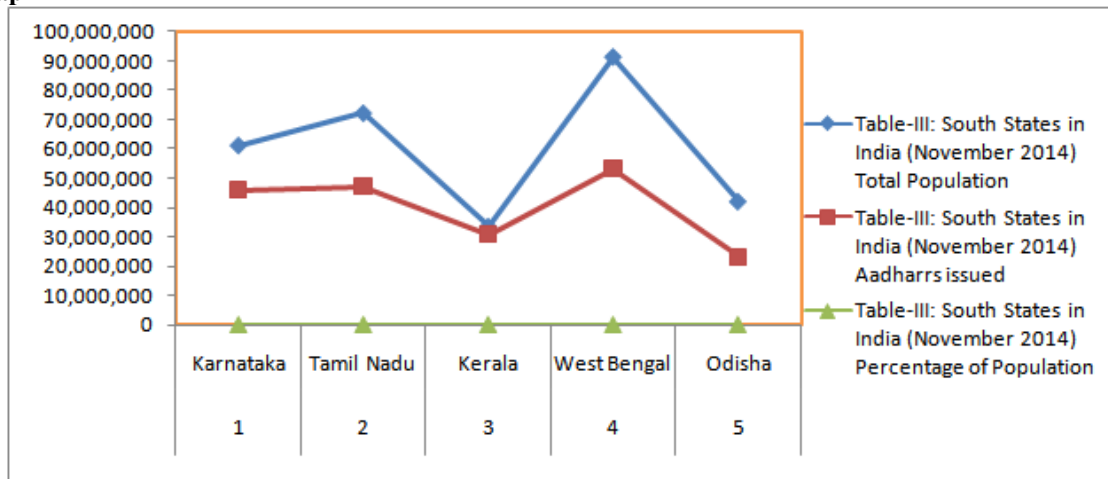
We have seen that from Table-I to Table-IV and Graph-I to Graph-IV, the aadharr numbers have issued in state wise and population was considered as 2011 census in India. Also we will try to calculate aadharr numbers from year 2008-2009 to 2013-2014 by using Mathematical Corruption Model. In this connection we assume the base year March 2008-March 2009, therefore we assume C=0 when t=0. Also we have known the data of actual measuring the population for issuing aadharr card numbers in every year mathematical model period that is t=1 year. Here we have to try for measuring population for issuing aadharr card number by using Mathematical Growth Model.

Graph-IV
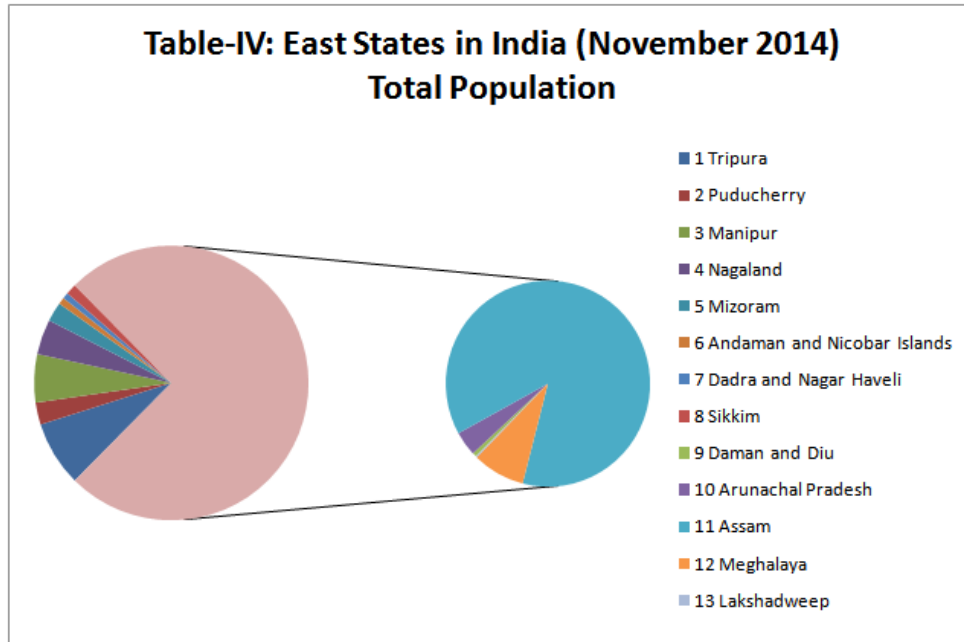
We consider up to March 2009 as a base year, Therefore we assume on March 2009, Mathematical model period t=1 year, MEV constant $\mathbb{K}=0$, Population for issuing aadharr card number C (0) = C_0= 1.00 crore. Also C (t) depends on MEV constant $\mathbb{K}$, therefore C (t) = 1.9988, Therefore we know the Mathematical Growth Model is as follows

$$C\ (\mathbb{K}, t) = C_0 (\mathbb{K} + 1)^t \qquad \text{---------------} \quad (i)$$

Where $\mathbb{K}$ = MEV Constant, t= Mathematical Model Period.
Here we assume that t= 1 year, therefore we will try to measure growth of population for issuing aadharr card number from base March 2009. Also we know MEVC Model is as

$$\mathbb{K} = [\frac{C(t)}{C(0)}]^{\frac{1}{t}} - 1 = 0.9988, \ -1 < \mathbb{K} < 1 \qquad \text{---------------} \quad (ii)$$

From equation (i) and (ii), we have

$$C = 1.00 \times (\mathbb{K} + 1)^{\frac{t}{1}} \qquad \text{--------------} \quad (iii)$$

This is known as **Mathematical Growth Model with related time formula.**
Here we assume year 2008-2009 is a base year. Therefore,
Now at March 2009, t=1 year from base, Therefore
From equation (iii), we have
Therefore, **C = 1.9988 crore**
Now at March 2010, t=2 years from base, Therefore
From equation (iii), we have
Therefore, **C = 3.9952 crore**
Now at March 2011, t=3 years from base, Therefore
From equation (iii), we have
Therefore, **C = 7.98561 crore**
Now at March 2012, t=4 years from base, Therefore
From equation (iii), we have
Therefore, **C = 15.96164 crore**
Now at March 2013, t=5 years from base, Therefore

From equation (iii), we have
Therefore, **C = 31.90413 crore**
Now at March 2014, t=6 years from base, Therefore
From equation (iii), we have
Therefore, **C = 63.76998 crore**
Now at March 2015, t=7 years from base, Therefore
From equation (iii), we have
Therefore, **C = 127.46344 crore**
We have seen from the above, we found the population for issuing aadharr card numbers of each year from base year 2008-2009.

3.1 Mathematical Result[18]:
From the above calculated data for issuing aadharr card numbers to the peoples of India. It can be put in the following table-V.

Table-V

| Year	For issuing aadharr numbers (calculated data) (crore)	For issuing aadharr numbers (Real data)[15] (crore)
2008-2009	1.9988	0.00
2009-2010	3.9952	0.00
2010-2011	7.98561	7.93
2011-2012	15.96164	15.96
2012-2013	31.90413	32.20
2013-2014	63.76998	62.80
2014-2015	127.46344	117.62

Graph-V
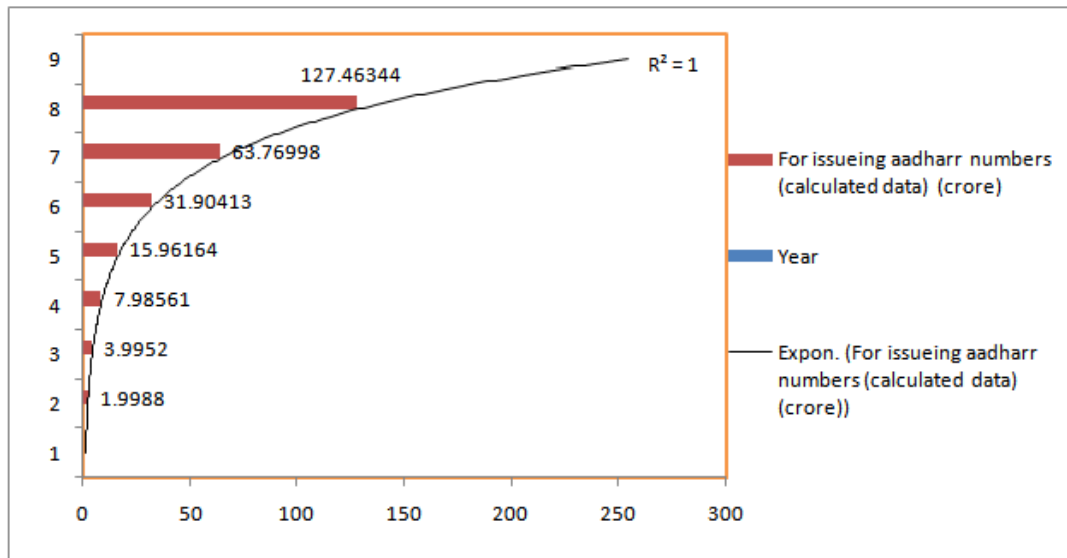
From table-V and Graph-V, we have seen that the regression square (R^2) is equal to 1. Therefore the Mathematical corruption model is fit statistically and it is valid with the real data. Also we have observed that Mr. Gopal Prasad at New Delhi has given information for expending the amount on for issuing aadharr card in last five years through right information act (RTI) from UIDAI[13]. The central government scheme 'AADHARR CARD' has expensed Rs. 4365 crore among the last five years. It has shown in the following table-VI and graph-VI:

Table-VI: 'AADHARR CARD EXPENSES IN LAST FIVE YEARS' [13][16][17]

Year	Central Government gave fund to UIDAI(Rupees)	UIDAI expenses for Aadharr card (Rupees)	For issuing aadharr numbers (Real data) (crore)[15]
2009-2010	26,38,00000.00	26,21,00000.00	0.00
2010-2011	273,81,00000.00	268,41,00000.00	7.93
2011-2012	1200,0000000.00	1187,50,00000.00	15.96
2012-2013	1350,0000000.00	1336,72,00000.00	32.20
2013-2014	1550,0000000.00	1544,44,00000.00	62.80

Graph-VI
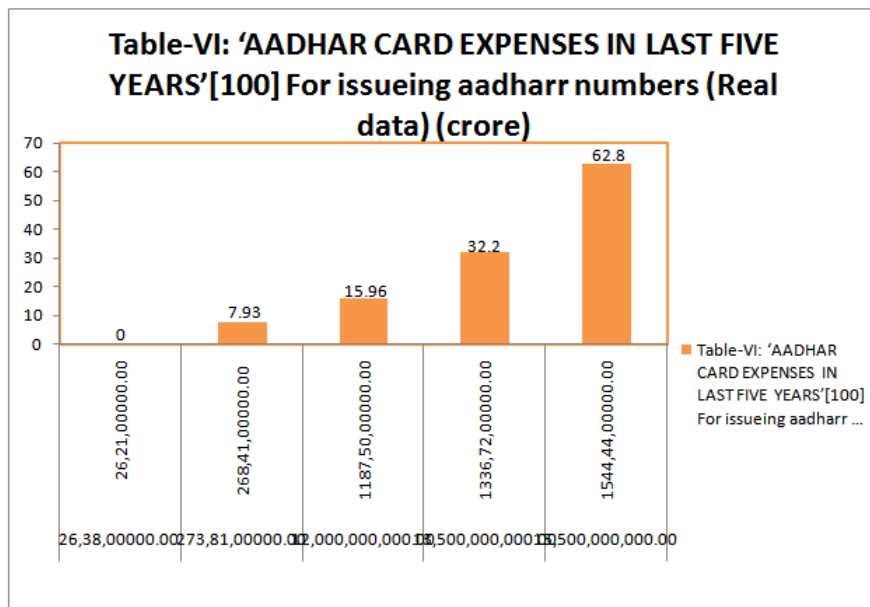
Now from table-V and graph-V, we have observed that in the year 2008-09 that is March 2009 expected aadharr numbers issued was 1.9988 crore but in reality it was zero. Then in next year 2009-2010 that is March 2010 expected was 3.9952 crore but it was zero in reality and it expenses an amount **Rs.26.21 crore**. Further from table-VI and graph-VI, In the year 2010-2011 expected 7.98561 crore but actually it was 7.93 crore, for this it expenses an amount Rs. 268.41 crore. Therefore, the amount for 1 aadharr card number issued = **Rs. 33.84741**

In the year 2011-2012 expected 15.96164 crore and actually 15.96 crore, for this it expenses an amount Rs. 1187.50 crore.

Therefore, the amount for 1 aadharr card number issued = **Rs. 149.12827**

In the year 2012-2013 expected 31.90413 crore and actually 32.20 crore, for this it expenses an amount Rs.1336.72 crore.

Therefore, the amount for 1 aadharr card number issued = **Rs. 82.31034**

In the year 2013-2014 expected 63.76998 crore and actually 62.80 crore, for this it expenses an amount Rs. 1544.44 crore.

Therefore, the amount for 1 aadharr card number issued = **Rs. 50.4719**

Table-VII: AMOUNT FOR ISSUEING 1 AADHARR CARD NUMBER[18]:

| Year	UIDAI expenses for Aadharr card (Rupees)	Aadharr card numbers (Real data) (crore)[15]	Amount for issuing 1 aadharr card number (Rupees)
2009-2010	26,21,00000.00	0.00	0.00
2010-2011	268,41,00000.00	7.93	33.84741
2011-2012	1187,50,00000.00	8.03	149.12827
2012-2013	1336,72,00000.00	16.24	82.31034
2013-2014	1544,44,00000.00	30.6	50.4719

Therefore we have seen that from last five years the total amount Rs. 4363.28 crore expenses for issuing aadharr card numbers 62.80 crore up to march 2014.

Therefore, the average amount for 1 aadharr card number issued $= \frac{4363.28}{62.80} = 69.47898$

Average amount for 1 aadharr card number issued = Rs. 69.50

This shows that from the above results, we have found the amount for issuing 1 aadharr card number, these amounts is impossible but it has shown in reality.

 Graph-VII
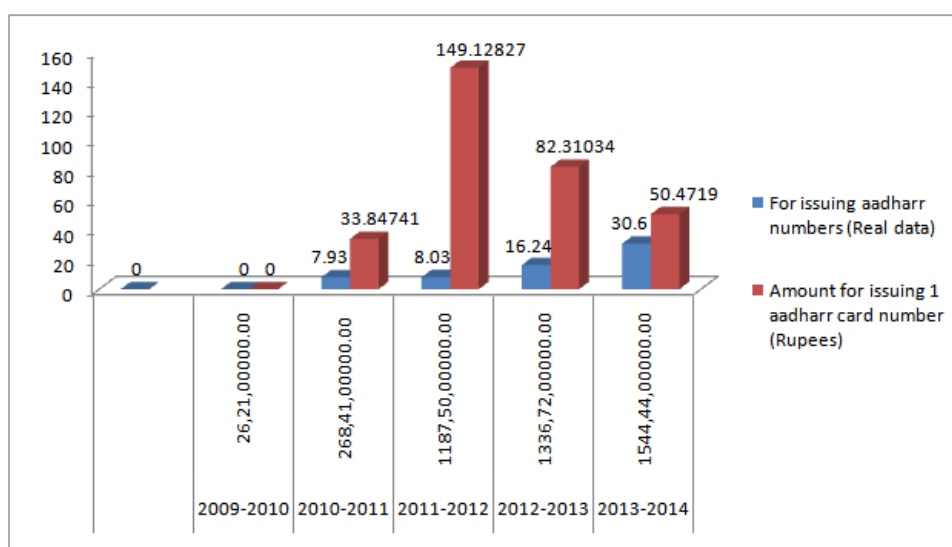
We have seen from table-V to table-VII and graph-V to graph-VII that a aadharr card numbers have issued in every year from base year 2008-2009. In this connection a lot of amounts have expensed for issuing 1 aadharr card number in every year from base 2008-2009. These amounts have shown in corruption in every year from base. This is a real fact. Therefore, the mathematical corruption model is valid and it is statistically fit.

III. CONCLUSION
We have seen from the above data, we have concluded that 'By using the mathematical corruption model, we found the quantity for issuing aadharr card number in a particular period from 2008-2009 to 2014-2015. Then we will check validity for calculated data to the real data for issuing aadharr card number and it is valid. Also we have seen the expenses amount in a particular year was very high that is amount for 1 issuing aadharr card is very big. It is impossible but it has shown in reality. This is the corruption. Therefore we say 'the mathematical corruption model is fit statistically and it is valid with the real data of society'. The real data and Actual data has shown in the following graph.

The Comparative Study between the Real data and Actual data:
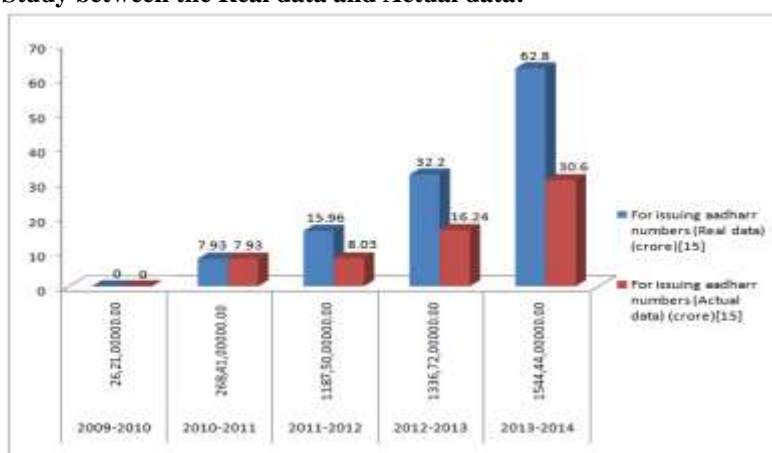
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