

# *Impact of TRAI's spectrum recommendation on Consumers and Industry*

PwC Assessment  
of TRAI Recommendations

July 2012

Volume II











# Contents

*Executive Summary* 05

*Cost per minute impact* 13

*EBITDA, PBIT, ROCE Calculations* 22





# Executive Summary

PwC's assessment of TRAI's recent report on "Analysis of effects on costs, tariffs and financial returns", indicates TRAI's analysis when corrected for given considerations leads to a projected per minute tariff impact to the tune of 44 paisa compared to 8.6 paisa as estimated by TRAI in its Track I calculations which presume that all existing spectrum allocations would be re-priced at reserve/auction price for a 10-year tenure at the time of license extension. We estimate a tariff impact to the tune of 60 paisa as compared to 9.4 paisa calculated by TRAI under Track II which assumes that all existing spectrum allocations would be re-priced at reserve/auction price in the year 2012-13 for a 20-year tenure.

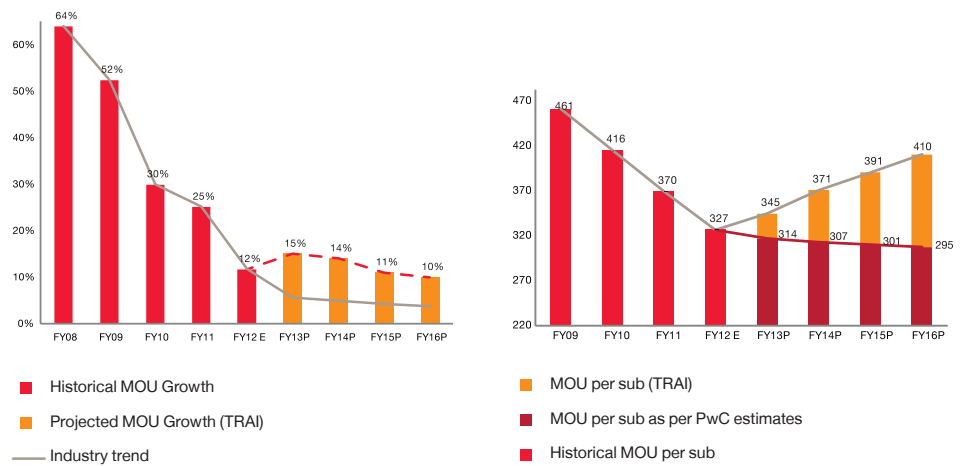
This summary is presented in continuation to an earlier PwC paper on "Impact of TRAI recommendations on consumers and industry" published in April 2012. We have assessed TRAI's "Analysis of effects on costs, tariffs and financial returns" published on 12th July 2012. In this paper TRAI states that they have attempted to address the concerns raised by various stakeholders and re-computed the incremental impact of their Recommendations (including Reserve Price) on per minute costs and profitability across the sector. In the present analysis, TRAI has partially considered cost implications with respect to spectrum rights and outgoing calls. TRAI also provides analysis on potential impacts to the industry in terms of EBITDA, PBIT and ROCE.

We have not had access to TRAI's price calculations and therefore, where appropriate we have maintained consistency in our assumptions from the previous analysis.

## 1. TRAI projects high MOU growth

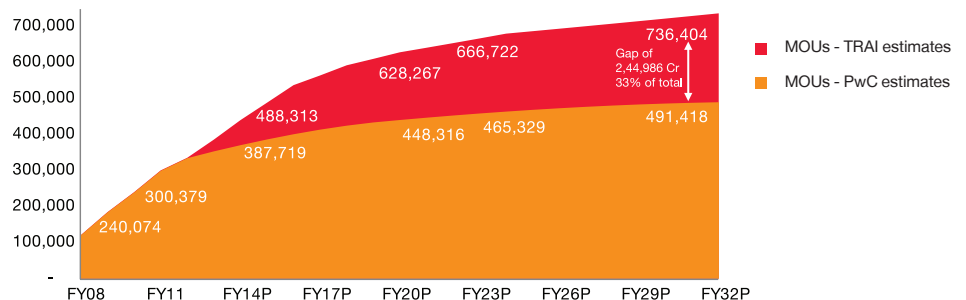
TRAI continues to assume high minutes growth and this does not align with past industry trends in all countries around the world which show a long-term decline in MOU per subscriber over time. Per TRAI estimates, Minutes of Use (MOU) per subscriber per month will grow from 327 in FY'12 to 410 by FY'16. This is in contrast to the last four years where MOU per subscriber per month has declined from 455 minutes in FY'08 to 327 minutes in FY'12.

Chart 1: MOU growth (FY 08 - FY 16P) & MOU per subscriber (FY 09 - FY 16P)



Source: TRAI, PwC Analysis. Note: MOU per subscriber per month are based on TRAI performance indicator report and projected values are based on subscriber estimates from TRAI document and industry trend for MOU growth.

Chart 2: TRAI and PwC MOU estimates (FY13-32) (In Cr)



Source: TRAI, PwC Analysis. Note: Total MOUs are based on TRAI performance indicator report and projected values are based on subscriber estimates from TRAI document and industry trend for MOU growth.

## 2. **Non-voice revenue projections for India appear unrealistic**

TRAI predicts non voice growth to reach to 50% in the next five years in Metros and in the next ten years for the Rest of India. This is contrary to the Indian experience of last few years where non-voice revenue is stagnant at 12-14% and no country in the world has achieved 50% of non-voice revenue except Japan (refer Table 1). Therefore India is unlikely to see non-voice usage as 50% of revenue by FY'22 as estimated by TRAI. The high growth rate assumed leads to an under-estimation of the impact on voice tariffs.

Table 1: Comparison of change in non-voice usage with change in MOU (2010)

Country	GDP per Capita (\$)	MOU - (Min.) YoY	Non-voice % - (US\$) YoY of ARPU	Broadband Penetration (%)	Content Reach-ability*	Average Spectrum per operator (MHz)	Spectrum Assigned for commercial wireless use	Potentially usable spectrum/ in pipeline	New spectrum to be allocated as % of current
Japan	40,281	-1.2%	48.9%	26%	99%	87	347	400	115.2%
US	33,790	-3.2%	33.2%	27%	99%	82	409.5	50	12.2%
Canada	36,058	-5.4%	25.4%	30%	99%	54	270	200	74.0%
France	39,658	-2.3%	25.7%	34%	99%	125	375	250	66.6%
South Korea	45,416	-2.5%	21.7%	34%	99%	90	270	120	44.4%
Spain	35,245	-1.1%	19.0%	22%	98%	90	415	270	65.0%

Source: BoFA ML Wireless Matrix Q1 2011, Plum consulting, [blog.ctia.org/2011/07/26/spectrum-availability-for-wireless-how-do-we-compare/](http://blog.ctia.org/2011/07/26/spectrum-availability-for-wireless-how-do-we-compare/)  
 \*Content reach-ability based on availability of content in English Language

## 3. **TRAI estimates do not factor in the additional spectrum and associated costs to satisfy growth in voice and non-voice traffic**

TRAI overlooks the additional spectrum and associated costs that will be required to service the huge growth in voice and non-voice traffic implied by its workings, which estimate MOU growth of 1.9 x and non-voice revenue growth of 9x over the 20 year period.

## 4. **TRAI under-estimates payout on account of spectrum by industry**

The Present Value of all future spectrum payment as considered by TRAI in its model is in the range of INR 1,90,000 to INR 2,70,000 Crores under Track I and Track II, compared to our estimates of INR 4,11,000 Crores for 800 MHz, 900 MHz and 1800 MHz spectrum.

## 5. **Additional capital investments required not considered**

Coupled with the assumptions of high growth in voice and non-voice revenues it appears, TRAI has assumed no further capital investments would be needed to cater for this growth. Operators are already struggling to support new subscribers with the current spectrum held and have been continually requesting for more spectrum. In light of this, industry believes additional spectrum is required to deliver the traffic growth. The expenditure on acquiring such additional spectrum would be accompanied by significant additional capital investment by operators, which are not included in the current TRAI calculations.

**6. Spectrum refarming cost projected by TRAI is inconsistent with operational realities**

TRAI considers spectrum refarming costs as recommended by the industry, but its working omits the full impact of additional operational costs and capital expenditure amortization. Spectrum refarming will lead to the replacement of active equipment of about 287,000 sites, and an additional 172,000 sites servicing the 1800MHz band will need to be deployed to meet current voice and non-voice traffic. The industry estimates that the additional cost of capex amortization and the increase in annual operating expenses for additional sites will be in excess of INR 234,700 Crores over the TRAI estimates for next 20 years.

**7. Operators' inability to raise further funds**

The current capital deployed in the industry is INR 235,000 Crores. This would be expected to grow to INR 662,000 Crores by FY'15 on account of spectrum costs and refarming alone. In the current market circumstances it is unlikely that the industry would be in a position to raise debt or equity to cover these needs. Given the present high debt burden on operators (INR 185,000 Crores) which equates to a Debt/EBITDA of 4.87, it will be difficult for operators to satisfy creditworthiness for further lending. Current debt already includes borrowings that could potentially become non-performing for lenders, due to cancellation of licenses or if operators exit from the market. We expect that such outcomes for the industry may result in further difficulties for existing telecom operators to borrow more, since risk factor associated with lending to the industry would rise.

**8. TRAI analysis doesn't include computational details on financial parameters**

TRAI has not provided any details around how it calculates impacts on Operating Cost, EBITDA margins, PBIT and ROCE in its paper. For example, the paper explains that EBITDA will grow to healthy levels of over 40% in 8 years and ROCE to over 13% in the similar period. These are critical metrics for the industry, and the outcomes appear healthier than our analysis suggests (refer table 4 and table 5), but we have been unable to validate these estimates since the approach used is not explained.

**9. Impact Assessment omits the effect of Service Tax on incremental costs**

TRAI has also not taken into account the forecast impact of service tax on its incremental cost per minute assessment, thereby, underestimating the tariff per minute impact by 12.36%.

Indian mobile operators' financial performance will be impacted by the recommendations due to the proposed heavy spectrum costs. In the past, operators have had some ability to absorb cost increases but we believe that the industry does not have the capacity to do so now given their eroding profit margins, returns below cost of capital and unsustainable debt service burdens. In our analysis potential tariff impact has been assessed by calculating pass-through of cost impact with added impact of license fees, spectrum usage charges and service tax. As a result of the above considerations only, PwC's assessment estimates that the tariff per minute will increase in range of 44 paisa to 60 paisa compared to 8.6 to 9.4 paisa as estimated by TRAI in its Track I and Track II calculations.

### A. Our Assessment of Cost and Tariff Impact

The factors as mentioned above impact both the Track I and Track II calculations carried out by TRAI. When we compare the two tracks presented by TRAI, we find that the model under Track II gives a somewhat more realistic representation of industry level impact of spectrum policy as all operators are assumed to extend their spectrum post auction under this scenario.

Any reasonable evaluation of higher value of spectrum can only be based on repricing the industry spectrum at one time and see its impact on the total traffic, although actual extensions and payouts may happen at different times.

Table 2: An overview of recalculation to TRAI's estimates in Annexure IIa and IIb (Track II): Assuming all operators to extend spectrum post auction for 20 years

	FY13	FY19	FY25	FY31
Spectrum cost amortization (INR Cr) <i>(Only for current spectrum deployed and additional spectrum for auction in 1800 Mhz)</i>	20,573	20,573	20,573	20,573
Refarming capex amortization & opex (INR Cr) <i>(As per Analysys Mason estimates)</i>	-	17,358	22,464	29,305
Saving in spectrum usage charges (SUC) (INR Cr) <i>(Based on TRAI estimates)</i>	(1,383)	(1,453)	(1,490)	(1,562)
<b>Likely impact due to additional Costs (INR Cr)</b>	<b>19,190</b>	<b>36,478</b>	<b>41,546</b>	<b>48,315</b>
<b>With 15% return on incremental capex due to spectrum policy</b>				
15% return on incremental capex (INR Cr) <i>(Incremental capex on spectrum cost and refarming)</i>	61,718	68,760	68,760	68,760
Cost per minute impact- only revenue earning minutes - o/g (INR) <i>(Post excluding impact on non-voice revenue)</i>	0.26	0.35	0.36	0.37
Net impact per minute on o/g voice after additional cost for regulatory levies (INR) <i>(loading License Fee -8% &amp; SUC -3%)</i>	0.29	0.39	0.41	0.42
Potential Increase in tariff post adjusted for service tax (12.36%)(INR)	0.32	0.44	0.46	0.47
<b>Potential tariff increase (INR)</b> <i>(Average for 20 years)</i>		<b>0.44</b>		
<b>TRAI estimate on tariff increase (INR)</b> <i>(Average for 20 years)</i>		<b>0.094</b>		

Note:

- MOU kept constant at FY'12 level due to spectrum constraints.
- Non-voice revenue assumed to grow from 14% of revenue in FY'12 to 25% by FY'32. However, cost for additional spectrum and capital investment required to service non-service revenue has not been considered.
- Spectrum cost includes cost of all current spectrum deployed. Spectrum cost for 700 MHz, 2100 MHz and 2300 MHz spectrum is not taken into consideration in above calculations.
- Capex and opex numbers are based on industry estimate (Analysys Mason report on impact of spectrum refarming)
- Only additional capital employed for spectrum cost and refarming capex is considered for 15% return calculations.

Since a policy decision today will have a long term impact on the industry, we believe the impact of the TRAI assumptions should be made on a Net Present Value (NPV) basis. The Track I scenario assumes that operators will pay for re-priced spectrum at different points in time depending upon the time at which licenses come up for extension. Thus, some operators will have a much higher spectrum cost burden at any given point in time as compared to others. Hence, we believe that Track I analysis by TRAI is not a practical scenario. However, for the purposes of analysis, we have provided an assessment of both Track I and Track II.



Table 3: An overview of recalculation to TRAI's estimates in Annexure Ia and Ib (Track I): Assuming all operators to extend spectrum as and when license expires

	FY13	FY19	FY25	FY31
Spectrum cost amortization (INR Cr) <i>(Only for current spectrum deployed and additional spectrum for auction in 1800 Mhz)</i>	6,044	17,833	49,252	107,052
Refarming capex amortization & opex (INR Cr) <i>(As per Analysys Mason estimates)</i>	-	17,358	22,464	29,305
Saving in spectrum usage charges (SUC) (INR Cr) <i>(Based on TRAI estimates)</i>	-	(847)	(1,485)	(1,562)
<b>Likely impact due to additional Costs (INR Cr)</b>	<b>6,044</b>	<b>34,344</b>	<b>70,231</b>	<b>134,795</b>
<b>With 15% return on incremental capex due to spectrum policy</b>				
15% return on incremental capex (INR Cr) <i>(Incremental capex on spectrum cost and refarming)</i>	18,133	42,858	89,986	176,686
Cost per minute impact- only revenue earning minutes - o/g (INR) <i>(Post excluding impact on non-voice revenue)</i>	0.08	0.28	0.55	1.01
Net impact per minute on o/g voice after additional cost for regulatory levies (INR) <i>(loading License Fee -8% &amp; SUC -3%)</i>	0.09	0.31	0.62	1.13
Potential Increase in tariff post adjusted for service tax (12.36%) (INR)	0.10	0.35	0.69	1.27
<b>Potential tariff increase (INR)</b> <i>(Average for 20 years)</i>		<b>0.60</b>		
<b>TRAI estimate on tariff increase (INR)</b> <i>(Average for 20 years)</i>		<b>0.086</b>		

Note:

- MOU kept constant at FY'12 level due to spectrum constraints.
- Non-voice revenue assumed to grow from 14% of revenue in FY'12 to 25% by FY'32. However, cost for additional spectrum and capital investment required to service non-service revenue has not been considered.
- Spectrum cost includes cost of all current spectrum deployed. Spectrum cost for 700 MHz, 2100 MHz and 2300 MHz spectrum is not taken into consideration in above calculations.
- Capex and opex numbers are based on industry estimate (Analysys Mason report on impact of spectrum refarming)
- Only additional capital employed for spectrum cost and refarming capex is considered for 15% return calculations.

### B. Our assessment of impact on EBITDA, PBIT and ROCE

The factors as mentioned above impact both the Track I and Track II EBITDA, PBIT and ROCE calculations carried out by TRAI. Accordingly, we have recalculated EBITDA, PBIT and ROCE to reflect the issues mentioned above for both Track I and Track II (Refer to Table 4 and Table 5).

Table 4: An overview of recalculation to TRAI's estimates in Annexure IIa (Track II): Assuming all operators to extend spectrum post auction for 20 years

	FY13	FY19	FY25	FY31
Revenue (INR Cr)	147,130	152,106	158,544	167,036
Cost (INR Cr)	104,610	108,147	112,725	118,762
EBITDA (INR Cr)	42,521	43,959	45,819	48,273
EBITDA %	29%	29%	29%	29%
PBIT (INR Cr)	13,830	14,298	14,903	15,701
PBIT %	9%	9%	9%	9%
Estimated capital employed (INR Cr)	299,103	309,218	322,307	339,569
ROCE %	5%	5%	5%	5%
<b>Incremental impact due to spectrum policy</b>				
Opex for Spectrum Refarming and savings in SUC (INR Cr)	(2,194)	11,361	15,396	22,000
Adjusted EBITDA (INR Cr)	44,715	32,598	30,423	26,273
Adjusted EBITDA %	30%	21%	19%	16%
Spectrum cost amortisation and refarming capex amortization (INR Cr)	-	22,920	22,920	22,920
Adjusted PBIT (INR Cr)	16,025	(19,983)	(23,413)	(29,219)
Adjusted PBIT %	11%	-13%	-15%	-17%
Incremental capital employed (including spectrum costs and refarming capex) (INR Cr)	411,454	458,398	458,398	458,398
ROCE %	2%	-3%	-3%	-4%

**Note:**

- Current industry revenue is increased for higher share of no-voice revenue year on year.
- EBITDA margins and PBIT margins for the industry are assumed to remain constant at current levels over next 20 years.
- Revenue as % of capital employed in Indian telecom industry is around 49% over the few years, which is assumed to remain at 49% over next 20 years to calculate future capital employed.
- Additional impact due to policy changes is considered on and above normal business returns industry has witnessed over the years. Impact of reduction in spectrum usage charges, spectrum refarming opex, spectrum refarming capex and spectrum cost is considered over business as usual assumptions to derive impact on industry due to proposed policy changes.



Table 5: An overview of recalculation to TRAI's estimates in Annexure Ia (Track I): Assuming all operators to extend spectrum as and when license expires

	FY13	FY19	FY25	FY31
Revenue (INR Cr)	147,130	152,106	158,544	167,036
Cost (INR Cr)	104,610	108,147	112,725	118,762
EBITDA (INR Cr)	42,521	43,959	45,819	48,273
EBITDA %	29%	29%	29%	29%
PBIT (INR Cr)	13,830	14,298	14,903	15,701
PBIT %	9%	9%	9%	9%
Estimated capital employed (INR Cr)	299,103	309,218	322,307	339,569
ROCE %	5%	5%	5%	5%
<b>Incremental impact due to spectrum policy</b>				
Opex for Spectrum Refarming and savings in SUC (INR Cr)	-	13,667	17,761	24,479
Adjusted EBITDA (INR Cr)	42,521	30,292	28,059	23,794
Adjusted EBITDA %	29%	20%	18%	14%
Spectrum cost amortisation and refarming capex amortization (INR Cr)	-	19,580	35,649	91,196
Adjusted PBIT (INR Cr)	13,830	(18,949)	(38,506)	(99,974)
Adjusted PBIT %	9%	-12%	-24%	-60%
Incremental capital employed (including spectrum costs and refarming capex) (INR Cr)	120,888	285,719	599,904	1,177,905
ROCE %	3%	-3%	-4%	-7%

Note:

- Current industry revenue is increased for higher share of no-voice revenue year on year.
- EBITDA margins and PBIT margins for the industry are assumed to remain constant at current levels over next 20 years.
- Revenue as % of capital employed in Indian telecom industry is around 49% over the few years, which is assumed to remain at 49% over next 20 years to calculate future capital employed.
- Additional impact due to policy changes is considered on and above normal business returns industry has witnessed over the years. Impact of reduction in spectrum usage charges, spectrum refarming opex, spectrum refarming capex and spectrum cost is considered over business as usual assumptions to derive impact on industry due to proposed policy changes.

## **PwC Approach**

We have assessed the results of the following Annexure of the TRAI document based on:

- Annexure Ia and Ib which are developed on normal scenario with Track 1 and full refarming assumptions. and
- Annexure IIa and IIb which are developed on normal scenario with Track 2 and full refarming assumptions

Our analysis is based on:

- Understanding and validating TRAI's workings and assumptions
- Recalculating results where necessary to remove inconsistencies
- Applying historic, current and forecast market indicators from India and elsewhere

The table below provides a comprehensive view of aspects assessed by PwC. Note that all impacts are calculated on a standalone basis.

### TRAI Assumptions and PwC Observations

TRAI Assumptions	Assessed by PwC
Total projected MOUs	Analyzed the MOU growth assumption basis the following: <ol style="list-style-type: none"> <li>1. Basis for TRAI estimate for MOU growth</li> <li>2. Subscriber growth based on TRAI's assumption</li> <li>3. Total MOU growth based on historical trends</li> <li>4. Validated calculations for subsequent years</li> </ol>
Voice and Non Voice revenues	<ol style="list-style-type: none"> <li>1. Basis of TRAI estimates for projections</li> <li>2. Validated assumptions on growth of non-voice revenue share based on historical trends and international experiences</li> </ol>
Spectrum Amortization Cost	<ol style="list-style-type: none"> <li>1. Reviewed the spectrum costs and quantum of spectrum assumption</li> <li>2. Re-calculated spectrum amortization costs</li> </ol>
Spectrum Refarming Cost	<ol style="list-style-type: none"> <li>1. Reviewed computations</li> <li>2. Assessed the additional capex and opex requirement due to refarming from industry estimates</li> </ol>
Cost per minute	<ol style="list-style-type: none"> <li>1. Reviewed computations done by TRAI</li> </ol>
Current Cost Structure	<ol style="list-style-type: none"> <li>1. Reviewed computations with TRAI assumptions</li> </ol>
EBIDTA/PBIT Margins	<ol style="list-style-type: none"> <li>1. Reviewed computations</li> </ol>
ROCE	<ol style="list-style-type: none"> <li>1. Reviewed computations</li> </ol>



## 2. Cost per Minute Impact

We understand that the cost per minute impact has been computed based on the following:

1. MOU (Minutes of Use) Growth
2. Revenue growth from voice and non-voice services
3. Assessment of cost impact due to changes in spectrum policy

In PwC's assessment the assumptions on MOU growth and non-voice revenue share of total revenue have been arrived at without properly considering past industry experience. In TRAI's calculations, MOU growth is taken at relatively high levels for the first four years (15%,14%,11% and 10% respectively) and then tapered down going forward, with a simultaneous increase in non-voice revenue from 18% to 50%. These growth rates are inconsistent with international experience, both in voice and data development.

### 2.1. MOU growth projected is not achievable

The proposed growth projected in the TRAI model cannot be supported on the basis of current market dynamics. The initial four years growth assumptions for minute of use of 15%, 14%, 11% and 10% is neither realistic nor based on historical trend.

- The growth rate of total minutes in India has slowed down in the last 5 years from 64% in FY'08 to only 11% in FY'12. A similar trend is also observed in MOU per subscriber per month, which has declined by 30% over the last 3 years. Going forward, as new subscribers are likely to be more price-sensitive rural users, it is unlikely that the average MOU per subscriber will now increase. In contrast to this, it appears in the TRAI model that the substantial MOU growth will come from MOU per subscriber growth by 25% in next four years from current 327 minutes to 410 minutes per subscriber by FY'16. This increase in MOU per subscriber per month seems unrealistic. In line with our views about the market, regression analysis would also suggest a declining trend for future growth (refer chart 1 and chart 2).
- In addition, any tariff increases forced as a result of incremental costs as set out by TRAI could result in even lower usage due to price elasticities and the sensitivity of many users of voice tariffs. Data from the recent past reflects the demand elasticity clearly. For instance, a 2% increase in call costs across the industry in Q2, 2011 resulted in a decline of 1.45% in the MOU per subscriber between Q1 to Q2, 2011 in India

TRAI in its paper appears to calculate the decrease in MOU growth per subscriber through references to VLR data (virtual location register). VLR data can usually not form the basis for such calculations, since operators churn non-revenue-adding customers on a periodic basis. TRAI states that MOU per VLR subscriber per month will decline to 415, while as per TRAI model it appears that MOU per VLR is increasing to 557 in FY'32 from 442 in FY'13.

Table 6: Calculation of MOU per VLR subscriber per month

Year	FY'13	FY'32	Ratio
Subscribers in Mn	932	1,412	1.5
VLR Subscribers in Mn	727	1,101	1.5
MOU per VLR Sub per Month	442	557	1.3

Source: TRAI, PwC analysis

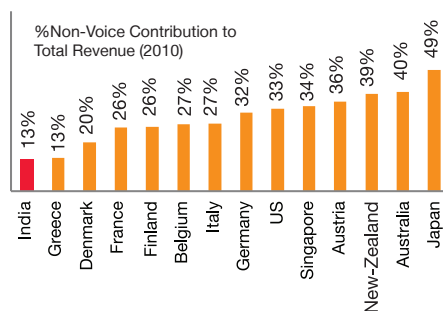
## 2.2. Non-voice revenue projections appear over-estimated

The TRAI model also makes assumptions around growth in non-voice services revenue which are without a clear basis from our knowledge of such growth in other markets, or of India's socio-economic environment. Non-voice revenue is assumed in the initial two years of the model to be at 18% and 20%, growing to 24% in FY'15. The TRAI paper assumes (under an optimistic scenario) that non-voice revenues will reach a share of 50% of total revenue in the Metros by FY'17 and the same in the Rest of India by FY'22. Of the 14% data share of total revenue today, message based services (mainly SMS) contribute about 9% and non-message i.e. "pure" data services contribute nearly 5%. There does not appear to be any basis to assume that non-voice revenue will reach 50% of the by FY'22 across India, as this has not been achieved even by developed countries (with the exception of Japan), all of which have a much higher literacy rate, higher smartphone penetration, and significantly higher broadband penetration than India. In India, most data services available today are in languages (such as English) which are not preferred languages for use by most subscribers.

So while TRAI predicts rapid voice usage growth, and even faster non voice revenue growth, we find that such a blend of assumptions contradicts international experience, where non-voice usually grows at the expense of voice growth.

In the US and France (refer chart 3), where non-voice contributes 33.2% and 25.7% of the mobile industry revenue respectively, minutes of use have fallen by 3.20% and 2.30% respectively in 2009-10.

Chart 3: Non-Voice Contribution to Total Revenue (2010) by Country



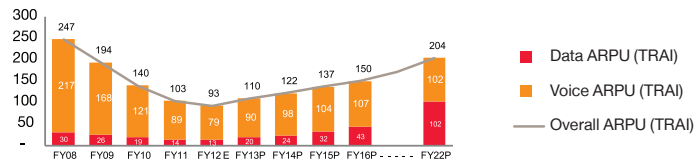
Source: BofA ML Wireless Matrix Q1 2011



In a research study conducted by the World Bank which depicts the relationship between broadband access and GDP growth, every 10% increase broadband penetration leads to an incremental increase of 1.4% in GDP<sup>1</sup>. The fundamental need to enhance broadband connections can be achieved through mobile broadband as it offers low accessibility cost to the end user. However, the TRAI model appears to make an inherent assumption that the cost of broadband access can be increased to load balance the increase in tariffs of voice usage.

Unrealistic assumptions around MOU and non-voice revenue are leading to improbable ARPU levels in the TRAI analysis. Chart 4 depicts ARPU growth trend and based on historical trends it can be determined that the level of ARPU projected in TRAI model is not achievable.

Chart 4: Non Voice(data) ARPU vs. Voice ARPU (INR)



Source: TRAI, PwC Analysis

### 2.3. TRAI's model does not reflect the overall cost impact

In our assessment we have appreciated that the TRAI model attempts to assess potential impact on the operators's margin due to policy changes. This is a welcome development. However, the model does not reflect the complete picture of the burden that operators will incur due to additional costs. We believe that to be done fully, this requires considering the following areas:

- Amortization of spectrum fees/ auction money
- Impact of capital and operating expenses due to spectrum refarming

<sup>1</sup> Qiang, C. Z. W., 2009. Telecommunications and Economic Growth, World Bank

*2.3.1. TRAI estimates do not include additional spectrum required to deliver growth in voice and non-voice traffic*

- Present value of all future spectrum payment as considered by TRAI in its model is in range of INR 190,000 to INR 270,000 Cr under Track I and Track II, compared to our estimates of INR 411,000 Cr for 800 MHz, 900 MHz and 1800 MHz spectrum. However, we are not able to ascertain the differences due to the absence of the necessary calculation details in the TRAI paper
- Operators have been constrained in subscriber growth due to spectrum limited spectrum availability and have been continually requesting for more spectrum. Whilst TRAI forecasts a 1.9x growth of MOU and 9x growth of non voice revenue over the 20 year period, it does not consider the additional spectrum costs that operators would need to finance in order to expand the capacity needed to carry this additional traffic. Therefore, in our assessment the calculations significantly underestimate the spectrum cost per minute to the subscriber. Data from the Wireless Planning Commission indicates that operators already have limited capacity to carry more traffic: there is 353.6 MHz of spectrum applications outstanding today, of which 171.0 MHz is for spectrum in Metros and Circle A (refer table 7). TRAI itself has acknowledged this paucity of available spectrum to operators, indicating that up to 800 MHz of spectrum is required to meet the next five year demand. This is the basis for its recommendation for putting up the 700 MHz Spectrum for auction in 2014

Table 7: Outstanding applications for spectrum by circle categories (Nov 2011)

Category	MHz
<b>Metro and Circle A</b>	<b>171.0</b>
Circle B	124.8
Circle C	57.8
<b>Total</b>	<b>353.6</b>

Source: WPC, November 2011

- We believe that operators will not only require the spectrum that has been deployed as of today but also the additional spectrum of 162.6 MHz as has been freed for auction (we refer to TRAI's "Recommendation on auction of spectrum" published on 23rd April 2012) to meet the current voice and non-voice volumes. We believe industry revenue growth can only happen with additional spectrum made available to operators
- Therefore, to be consistent, we have recalibrated TRAI's cost estimates per subscriber by holding today's voice traffic levels constant for the proposed 20 year period, so that the traffic consideration is more in line with the spectrum being accounted for carrying it



### *2.3.2. Estimated spectrum refarming costs appear inconsistent with operational realities*

- The TRAI model does not provide any details around the assumptions made on additional capex and opex costs due to spectrum refarming. Therefore we have been unable to assess the TRAI workings in detail. As per industry estimates<sup>2</sup>, spectrum refarming will lead to the replacement of active equipment of about 287,000 sites across all of India, and to the erection of an additional 172,000 sites servicing the 1800MHz band that will need to be deployed to meet current voice and non-voice traffic. Additional sites will be required, to this quantum, because of weaker propagation properties in the 1800 MHz band, compared to 900 MHz, meaning that a higher density of sites will be needed to provide the same levels of coverage. The industry estimates that the additional cost of capex amortization and the increase in annual operating expenses for additional sites will be in excess of INR 234,700 Crores over the TRAI estimates for next 20 years
- The TRAI model has made an assumption of 5% increase in operating cost for additional sites year on year as against average cost increase of over 13% in the past

### *2.3.3. Impact Assessment omits the effect of Service Tax on incremental costs*

- TRAI has also not taken into account the forecast impact of service tax on its incremental cost per minute assessment, thereby, under-estimating the tariff per minute impact by 12.36%

### *Our Assessment of Cost and Tariff Impact*

As a result of the above considerations, PwC's assessment estimates that the tariff per minute will increase in a range of 44 paisa to 60 paisa, compared to 8.6 paisa to 9.4 paisa as estimated by TRAI in its Track I and Track II calculations. Whilst we find important elements in each Track calculation that merit refinement, when we compare both tracks we believe the model as provided under Track II gives a better representation of industry level impact of spectrum policy as all operators are assumed to extend their spectrum post auction. Any reasonable evaluation of higher value of spectrum can only be based on repricing the industry spectrum at one time and see its impact on the total traffic, although actual extensions and payouts may happen at different times.

<sup>2</sup> Analysys Mason report on impact of spectrum refarming

### Revised cost per minute impact

We have recalculated TRAI's cost estimates per subscriber to reflect the issues mentioned above for both Track-II (reference to table 8) and Track-I (reference to table 9).

Table 8: An overview of recalculation to TRAI's estimates in Annexure IIa and IIb (Track II): Assuming all operators to extend spectrum post auction for 20 years

	FY13	FY14	FY15	FY16	FY17	FY18	FY19
Spectrum cost amortization (INR Cr)	20,573	20,573	20,573	20,573	20,573	20,573	20,573
Refarming capex amortis'n & opex (INR Cr)	-	6,126	10,130	15,317	15,963	16,644	17,358
Saving in SUG (INR Cr)	(1,383)	(1,391)	(1,409)	(1,428)	(1,450)	(1,452)	(1,453)
<b>Total Cost (INR Cr)</b>	<b>19,190</b>	<b>25,307</b>	<b>29,294</b>	<b>34,462</b>	<b>35,085</b>	<b>35,765</b>	<b>36,478</b>
Minutes (Cr)	335,562	335,562	335,562	335,562	335,562	335,562	335,562
Cost per minute impact (INR)	0.057	0.075	0.087	0.103	0.105	0.107	0.109
Cost per minute impact -Voice (INR)	0.049	0.065	0.074	0.087	0.088	0.089	0.090
Cost per minute impact- o/g Voice (INR)	0.098	0.129	0.149	0.174	0.176	0.178	0.181
Average Impact - o/g voice (INR)	0.19						
Average for 20 years							
TRAI estimate on average Impact - o/g voice (INR)	0.034						
Average for 20 years							
<b>With 15% return on additional capital investment</b>							
15% return on add'l capital investment (INR Cr)	61,718	64,534	68,760	68,760	68,760	68,760	68,760
Cost per minute impact- o/g Voice (INR)	0.26	0.29	0.32	0.35	0.35	0.35	0.35
Net impact per minute on o/g voice after loading LF (8%) & SUC (3%) (INR)	0.29	0.33	0.36	0.39	0.39	0.39	0.39
Potential Increase in Tariff post adj for service tax (INR)	0.32	0.37	0.41	0.44	0.44	0.44	0.44
Average Impact - o/g voice (INR)	0.44						
Average for 20 years							
TRAI estimate on average impact - o/g voice (INR)	0.094						
Average for 20 years							

Note:

- MOU kept constant at FY'12 level due to spectrum constraints.
- Non-voice revenue assumed to grow from 14% of revenue in FY'12 to 25% by FY'32. However, cost for additional spectrum and capital investment required to service non-service revenue has not been considered.
- Spectrum cost includes cost of all current spectrum deployed. Spectrum cost for 700 MHz, 2100 MHz and 2300 MHz spectrum is not taken into consideration in above calculations.
- Capex and opex numbers are based on industry estimate (Analysys Mason report on impact of spectrum refarming)
- Only additional capital employed for spectrum cost and refarming capex is considered for 15% return calculations.

FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32
20,573	20,573	20,573	20,573	20,573	20,573	20,573	20,573	20,573	20,573	20,573	20,573	20,573
18,109	18,897	19,725	20,593	21,506	22,464	23,469	24,526	25,634	26,799	28,021	29,305	30,653
(1,455)	(1,457)	(1,458)	(1,469)	(1,479)	(1,490)	(1,495)	(1,507)	(1,520)	(1,533)	(1,547)	(1,562)	(1,578)
<b>37,226</b>	<b>38,013</b>	<b>38,839</b>	<b>39,698</b>	<b>40,599</b>	<b>41,546</b>	<b>42,548</b>	<b>43,591</b>	<b>44,688</b>	<b>45,838</b>	<b>47,047</b>	<b>48,315</b>	<b>49,648</b>
335,562	335,562	335,562	335,562	335,562	335,562	335,562	335,562	335,562	335,562	335,562	335,562	335,562
0.111	0.113	0.116	0.118	0.121	0.124	0.127	0.130	0.133	0.137	0.140	0.144	0.148
0.092	0.093	0.094	0.096	0.097	0.099	0.100	0.102	0.104	0.105	0.107	0.109	0.111
0.183	0.186	0.189	0.192	0.195	0.198	0.201	0.204	0.207	0.211	0.214	0.218	0.222
68,760	68,760	68,760	68,760	68,760	68,760	68,760	68,760	68,760	68,760	68,760	68,760	68,760
0.35	0.35	0.36	0.36	0.36	0.36	0.36	0.36	0.37	0.37	0.37	0.37	0.38
0.40	0.40	0.40	0.40	0.40	0.41	0.41	0.41	0.41	0.41	0.42	0.42	0.42
0.45	0.45	0.45	0.45	0.45	0.46	0.46	0.46	0.46	0.47	0.47	0.47	0.47



Table 9: An overview of recalculation to TRAI's estimates in Annexure Ia and Ib (Track I): Assuming all operators to extend spectrum as and when license expires

	FY13	FY14	FY15	FY16	FY17	FY18	FY19
Spectrum cost amortization (INR Cr)	6,044	6,044	9,772	12,606	13,604	17,233	17,833
Refarming capex amortis'n & opex (INR Cr)	-	6,126	10,130	15,317	15,963	16,644	17,358
Saving in SUG (INR Cr)	-	-	-	(248)	(743)	(775)	(847)
<b>Total Cost (INR Cr)</b>	<b>6,044</b>	<b>12,170</b>	<b>19,902</b>	<b>27,675</b>	<b>28,824</b>	<b>33,101</b>	<b>34,344</b>
Minutes (Cr)	335,562	335,562	335,562	335,562	335,562	335,562	335,562
Cost per minute impact (INR)	0.018	0.036	0.059	0.082	0.086	0.099	0.102
Cost per minute impact – Voice (INR)	0.015	0.031	0.050	0.070	0.072	0.083	0.085
Cost per minute impact - o/g Voice (INR)	0.031	0.062	0.101	0.140	0.145	0.165	0.170
Average impact - o/g voice (INR)	0.29						
TRAI estimate on average Impact - o/g voice (INR) Average for 20 years	0.045						
<b>With 15% return on additional capital investment</b>							
15% return on add'l capital investment (INR Cr)	18,133	20,949	30,766	35,017	36,514	41,957	42,858
Cost per minute impact - o/g Voice (INR)	0.08	0.12	0.18	0.23	0.24	0.27	0.28
Net impact per minute on o/g voice after loading LF (8%) & SUC (3%) (INR)	0.09	0.13	0.20	0.26	0.27	0.30	0.31
Potential increase in Tariff post adj for service tax (INR)	0.10	0.15	0.23	0.29	0.30	0.34	0.35
Average impact - o/g voice (INR)	0.60						
TRAI estimate on average impact - o/g voice (INR) Average for 20 years	0.086						

Note:

- MOU kept constant at FY'12 level due to spectrum constraints.
- Non-voice revenue assumed to grow from 14% of revenue in FY'12 to 25% by FY'32. However, cost for additional spectrum and capital investment required to service non-service revenue has not been considered.
- Spectrum cost includes cost of all current spectrum deployed. Spectrum cost for 700 MHz, 2100 MHz and 2300 MHz spectrum is not taken into consideration in above calculations.
- Capex and opex numbers are based on industry estimate (Analysys Mason report on impact of spectrum refarming)
- Only additional capital employed for spectrum cost and refarming capex is considered for 15% return calculations.

FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32
21,813	27,354	30,348	33,256	33,302	49,252	58,560	61,839	73,761	75,774	88,849	107,052	116,885
18,109	18,897	19,725	20,593	21,506	22,464	23,469	24,526	25,634	26,799	28,021	29,305	30,653
(873)	(1,120)	(1,116)	(1,333)	(1,343)	(1,485)	(1,495)	(1,507)	(1,520)	(1,533)	(1,547)	(1,562)	(1,578)
<b>39,049</b>	<b>45,131</b>	<b>48,956</b>	<b>52,516</b>	<b>53,465</b>	<b>70,231</b>	<b>80,535</b>	<b>84,857</b>	<b>97,876</b>	<b>101,040</b>	<b>115,323</b>	<b>134,795</b>	<b>145,960</b>
335,562	335,562	335,562	335,562	335,562	335,562	335,562	335,562	335,562	335,562	335,562	335,562	335,562
0.116	0.134	0.146	0.157	0.159	0.209	0.240	0.253	0.292	0.301	0.344	0.402	0.435
0.096	0.110	0.119	0.127	0.128	0.167	0.190	0.199	0.227	0.232	0.263	0.304	0.326
0.192	0.221	0.238	0.254	0.256	0.334	0.380	0.397	0.454	0.465	0.526	0.609	0.652
48,828	57,140	61,630	65,993	66,061	89,986	103,949	108,866	126,750	129,769	149,382	176,686	191,435
0.31	0.36	0.39	0.41	0.41	0.55	0.63	0.65	0.75	0.76	0.87	1.01	1.08
0.35	0.41	0.44	0.46	0.47	0.62	0.70	0.73	0.84	0.86	0.97	1.13	1.21
0.39	0.46	0.49	0.52	0.52	0.69	0.79	0.82	0.94	0.96	1.09	1.27	1.36

---

# 3. EBITDA, PBIT, ROCE Calculations

We welcome TRAI's inclusion in the latest paper of potential impacts on the industry's financial performance. We understand that the purpose of EBITDA, PBIT, ROCE calculations are primarily to assess whether the industry has an ability to absorb the increase in cost due to policy changes or will pass on such cost to consumers. However in our assessment of these industry impacts in the TRAI paper, we do not see a methodology to calculate EBITDA, PBIT and ROCE. We also observe that the computations rely heavily on a few factors that in our opinion distort the outputs of this part of the analysis:

1. Assumptions of steep growth in voice and non-voice revenue
2. Marginal operating cost increases, despite steep revenue growth

Fundamentally, TRAI appears to have assumed significant growth in voice and non-voice revenues, but not considered the likely capital expenditure and operating expenditure burdens for achieving such growth.

### *3.1. Steep growth in voice and non-voice revenue*

We have elaborated our observations on voice and non voice revenue growth projections in para 2.1 and 2.2 of section 2. As mentioned earlier, we find that the basis for the increase in MOU traffic by 1.9x and in non-voice revenue from 17% to 50% of overall revenue by FY'22 is not in line with industry trends.

### *3.2. Marginal operating cost increase in spite of astonishing revenue growth*

The TRAI model has not elaborated its assumptions around cost estimates. The paper suggests a revenue increase of 3.1 times over the next 20 years, coupled with cost increases of only 1.8 times over the same period. We find that this mismatch between revenue and cost growth results in the paper forecasting industry EBITDA margins rising steeply to 40% in the next eight years.

In respect to revenue increases from the rise of non-voice services, industry experience to date has not indicated that such revenue increases are associated with a profitability increase. Much of content revenue sharing arrangements result in significant non-voice revenues being passed on to value chain participants and ecosystem partners, leading to decline in profit growth rates.

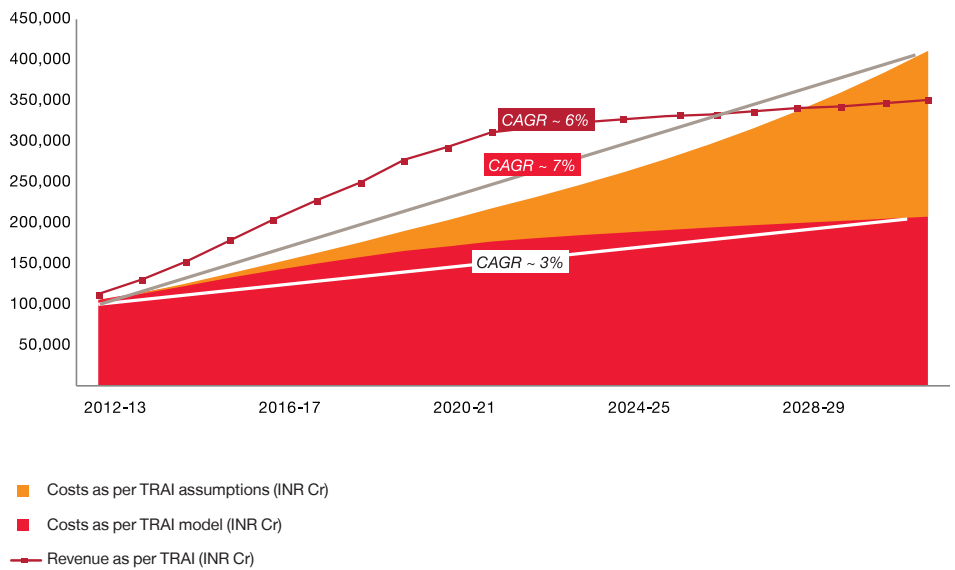
In fact, global experience in the past few years has shown that mobile operators' costs are rising faster than revenue. Recent analysis undertaken in the North America market shows that the cost of data may fall from \$20/GB in 2010 to \$7 in 2015, whereas revenue per user may fall from \$25/GB to only \$5 (source: Arlington Economics, LLC). Analysis also shows that while the demand for non-voice services is growing, it places increasing demand on



networks, which requires increased investments in network equipment and additional operating costs. Globally, mobile operators are facing the challenge of monetizing the increase in non-voice demand. Therefore, the TRAI projection that operators' margins will continue to increase or remain stable is contrary to global trends.

TRAI in their assumptions says that “Employees cost, administration cost, sales and marketing cost and other costs are estimated on a per subscriber basis. These costs grow with growth in the number of subscribers and are further escalated at 10%, 5%, 10% and 5% respectively per annum. Network operating cost and finance charges is estimated as a proportion of gross block. These costs grow with increase in gross block and are further escalated by 5% per annum”. If we assume their assumptions to be correct, and use them to re-compute the costs, the revised costs come out to be far higher than current estimates as per TRAI model (refer to chart 5).

Chart 5: Cost Growth Vs Revenue Growth



Source: Company website, PwC Analysis  
 Note: The chart above has been prepared based on cost break up of select Indian telecom operators.

**3.3. TRAI model has projected rising EBITDA margins due to steep revenue growth and marginal cost increase**

The reality is that Indian telecoms today has the lowest average EBITDA margins amongst all Emerging Asia countries. The average EBITDA margin in India dropped from 39.4% in 2006 to 28.9% in 2012. This industry average masks far lower margins of some operators during this period.

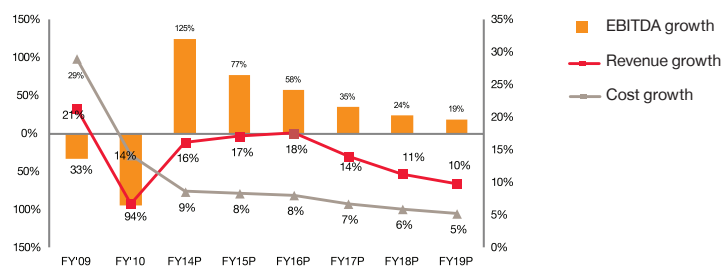
Table 10: Emerging Asia Telecoms EBITDA margins (2004 to 2012)

(%)	2004	2005	2006	2007	2008	2009	2010	2011	2012
Emerging Asia	47.50%	47.80%	46.90%	45.70%	43.90%	42.80%	42.10%	35.90%	36.10%
Bangladesh	47.30%	25.20%	39.70%	27.90%	32.80%	48.70%	41.90%	47.30%	47.10%
China	50.60%	50.10%	50.00%	50.70%	48.50%	45.40%	42.80%	40.90%	40.90%
<b>India</b>	<b>33.30%</b>	<b>35.70%</b>	<b>39.40%</b>	<b>38.40%</b>	<b>33.80%</b>	<b>32.30%</b>	<b>29.50%</b>	<b>28.20%</b>	<b>28.90%</b>
Indonesia	67.60%	66.20%	63.00%	57.80%	59.00%	55.30%	54.30%	53.20%	54.20%
Korea	37.30%	39.30%	36.40%	31.30%	30.10%	31.90%	31.80%	32.00%	33.20%
Malaysia	49.40%	52.70%	49.50%	48.40%	48.10%	46.60%	47.50%	47.10%	46.60%
Pakistan	48.70%	30.40%	29.40%	36.00%	32.10%	31.90%	34.60%	36.70%	37.60%
Philippines	63.70%	63.60%	64.90%	65.60%	64.80%	63.00%	62.90%	61.80%	62.00%
Thailand	54.00%	49.00%	44.70%	36.70%	37.30%	38.70%	41.60%	42.30%	41.50%

Source: BoFA ML Wireless Matrix Q1 2011,

In the past two years, growth in industry revenues has lagged cost growth. This trend can also be observed across various emerging economies in Asia who are faced with declining EBITDA margins (as shown in table 10). We find these actual trends to be inconsistent with the TRAI analysis which projects hitherto unforeseen growth in EBITDA margins (refer to chart 6). This does not concur with Indian as well as global telecom industry trends.

Chart 6: Growth in Revenue, Cost and EBITDA



Source: TRAI, PwC Analysis

### 3.4. Likely Impact on PBIT

Before calculating PBIT one needs to look at the reinvestment required for current infrastructure. We cannot comment on TRAI's PBIT calculations as the investment plan required to support PBIT calculation has not been disclosed in the paper. However, the PBIT growth trend as depicted in the TRAI model looks unachievable going by past industry trends where operator margins have been shrinking year on year.

The decline in operator's financial performance has been significant since 2007, as shown in Table 11, which shows how PAT margins have declined to single figures for most operators bar one of the reporting operators and to negative in some cases from 2007 to 2012. There is only one operator in India in FY 2012 reporting a double-digit PAT margin, and none at above 15%.

Table 11: PAT Margins of selected Operators, FY 2007-FY 2012

	FY2007	FY2008	FY2009	FY2010	FY2011	FY2012
Vodafone	17%	11%	0%	-3%	0.01%	NA
Idea Cellular	11%	15%	9%	8%	4%	4%
Aircel	35%	9%	-8%	-66%	-42%	NA
Reliance	22%	29%	27%	22%	7%	5%
Bharti	23%	25%	24%	26%	20%	14%
TTSL	-46%	-35%	-33%	-21%	-41%	NA
TTML	-22%	-7%	-8%	-14%	4%	-21%
Shyam Sistema	-53%	-158%	-620%	-616%	-310%	NA
HFCL Infotel	-42%	-57%	-96%	-11%	-93%	NA
MTNL	14%	12%	4%	-68%	-71%	-101%
BSNL	20%	8%	2%	-6%	-22%	NA

Source: Annual Filings of Operators with the Registrar of Companies, Capitaline, India Infoline, Company Websites. Reliance and MTNL FY 12 figures are based on 3 quarters.



### 3.5. Likely Impact on ROCE

TRAI has not provided Capital Employed details and hence, we are not in position to validate TRAI's ROCE projections. The current capital deployed in the industry is approximately INR 235,000 Cr which is expected to grow to INR 662,000 Crores by FY'15 on account of spectrum cost and refarming alone in Track II model.

Additionally, we have noted that, the debt burden of the Indian telecoms industry has increased significantly since 2009 to reach at Rs 185,720 Crores as on March 2012 (refer to table 12).

Table 12 : Debt burden of Indian telecom sector ( 2009 to 2012)

	2008-09	2009-10	2010-11	2011-12
Domestic Debt (Rs Cr)	46,980	80,807	94,319	93,594
External Debt in other currencies (USD Mn)	7,331	9,209	14,222.27	18,425
Exchange Rate (Rs per USD)	48.76	46.66	46.15	50.00
<b>Total Debt (Rs Cr)</b>	<b>82,726</b>	<b>123,775</b>	<b>159,955</b>	<b>185,720</b>

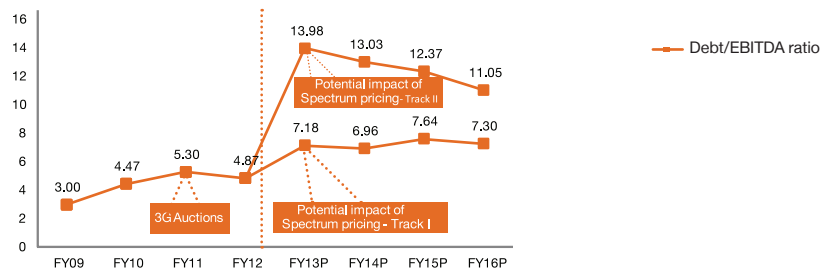
Source: RBI, Bank of America Merrill Lynch Wireless Matrix (4Q 2011)



In general, once Debt/EBITDA ratios exceed 3.0 in the telecom sector, it becomes difficult for operators to satisfy creditworthiness to banks for further lending. Including domestic and external debt, the Debt /EBITDA ratio in Indian telecoms has already risen to 4.87 in 2012.

We believe that the spectrum acquisitions going forward will have to largely be debt-funded. In such a scenario, the industry Debt/EBITDA ratio in future due to spectrum policy changes alone, will rise to 7-14x by 2013 (as depicted in chart 7). This excludes the additional funding that may be required for major activities such as network expansion or investments to grow data services. We expect that such outcomes for the industry may result in further difficulties for existing telecom operators to borrow more, since risk factors associated with lending to the industry would rise. This is further evidenced by a recent press release, where various state-owned banks (including SBI) have put a squeeze on funding new telecom projects.

Chart 7 : Debt-EBITDA ratio for Indian Telecom Sector, FY08- FY16P



Source: RBI, Bank of America Merrill Lynch Wireless Matrix (4Q 2011), PwC Analysis

In the past the operators have absorbed cost increases but we believe that the industry will not have the capacity to do the same in the future given their steadily eroding profit margins with current returns below cost of capital even for market leaders and their unsustainable debt service burden.

In short, we believe that the financing needs for the industry would inflate so steeply under the current spectrum recommendations that it would expose both the telecom industry and the financial services industry to a level of borrower and lender risk which would be unacceptable, and which would have wider risk implications for Indian corporate borrowing, and therefore for the economy.

*Our Assessment of EBITDA, PBIT and ROCE*

The factors as mentioned above impact both the Track I and Track II EBITDA, PBIT and ROCE calculations carried out by TRAI. TRAI has not provided any details around how it calculates impacts on Operating Cost, EBITDA margins, PBIT and ROCE in its paper. These are critical metrics for the industry, and the outcomes appear healthier than our analysis suggests, but we have been unable to validate these estimates since the approach used is not explained. Accordingly, we have recalculated EBITDA, PBIT and ROCE to reflect the issues mentioned above for both Track I & Track II. (Refer to Table 13 and Table 14).

Table 13: An overview of recalculation to TRAI's estimates in Annexure IIa (Track II): Assuming all operators to extend spectrum post auction for 20 years

	FY13	FY14	FY15	FY16	FY17	FY18	FY19
Revenue (INR Cr)	147,130	147,876	148,653	149,463	150,307	151,187	152,106
Cost (INR Cr)	104,610	105,140	105,692	106,268	106,868	107,494	108,147
EBITDA (INR Cr)	42,521	42,736	42,961	43,195	43,439	43,693	43,959
EBITDA %	29%	29%	29%	29%	29%	29%	29%
PBIT (INR Cr)	13,830	13,900	13,973	14,050	14,129	14,212	14,298
PBIT %	9%	9%	9%	9%	9%	9%	9%
Estimated capital employed (INR Cr)	299,103	300,619	302,199	303,845	305,561	307,350	309,218
ROCE %	5%	5%	5%	5%	5%	5%	5%
<b>Incremental impact due to spectrum policy</b>							
Opex for spectrum refarming and savings in SUC (INR Cr)	(2,194)	2,980	5,547	10,310	10,136	10,763	11,361
Adjusted EBITDA (INR Cr)	44,715	39,756	37,413	32,884	33,302	32,930	32,598
Adjusted EBITDA %	30%	27%	25%	22%	22%	22%	21%
Spectrum cost amortisation and refarming capex amortization (INR Cr)	-	20,573	21,511	22,920	22,920	22,920	22,920
Adjusted PBIT (INR Cr)	16,025	(9,652)	(13,085)	(19,181)	(18,927)	(19,471)	(19,983)
Adjusted PBIT %	11%	-7%	-9%	-13%	-13%	-13%	-13%
Incremental capital employed (including spectrum costs and refarming capex) (INR Cr)	411,454	430,226	458,398	458,398	458,398	458,398	458,398
ROCE %	2%	-1%	-2%	-3%	-2%	-3%	-3%

*Note:*

- Current industry revenue is increased for higher share of no-voice revenue year on year.
- EBITDA margins and PBIT margins for the industry are assumed to remain constant at current levels over next 20 years.
- Revenue as % of capital employed in Indian telecom industry is around 49% over the few years, which is assumed to remain at 49% over next 20 years to calculate future capital employed.
- Additional impact due to policy changes is considered on and above normal business returns industry has witnessed over the years. Impact of reduction in spectrum usage charges, spectrum refarming opex, spectrum refarming capex and spectrum cost is considered over business as usual assumptions to derive impact on industry due to proposed policy changes.

FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32
153,064	154,065	155,111	156,204	157,348	158,544	159,797	161,110	162,485	163,929	165,444	167,036	168,709
108,829	109,540	110,284	111,061	111,874	112,725	113,616	114,549	115,527	116,553	117,631	118,762	119,952
44,236	44,525	44,827	45,143	45,474	45,819	46,181	46,561	46,958	47,375	47,813	48,273	48,757
29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%
14,388	14,482	14,580	14,683	14,791	14,903	15,021	15,144	15,274	15,409	15,552	15,701	15,859
9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
311,166	313,201	315,328	317,550	319,875	322,307	324,854	327,522	330,319	333,253	336,333	339,569	342,971
5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
12,068	12,461	13,293	13,800	14,681	15,396	16,380	17,397	18,465	19,587	20,764	22,000	23,299
32,168	32,064	31,534	31,343	30,793	30,423	29,802	29,164	28,493	27,789	27,050	26,273	25,458
21%	21%	20%	20%	20%	19%	19%	18%	18%	17%	16%	16%	15%
22,920	22,920	22,920	22,920	22,920	22,920	22,920	22,920	22,920	22,920	22,920	22,920	22,920
(20,600)	(20,899)	(21,633)	(22,037)	(22,810)	(23,413)	(24,279)	(25,172)	(26,111)	(27,097)	(28,132)	(29,219)	(30,360)
-13%	-14%	-14%	-14%	-14%	-15%	-15%	-16%	-16%	-17%	-17%	-17%	-18%
458,398	458,398	458,398	458,398	458,398	458,398	458,398	458,398	458,398	458,398	458,398	458,398	458,398
-3%	-3%	-3%	-3%	-3%	-3%	-3%	-3%	-3%	-3%	-4%	-4%	-4%



Table 14: An overview of recalculation to TRAI's estimates in Annexure Ia (Track I): Assuming all operators to extend spectrum as and when license expires

	FY13	FY14	FY15	FY16	FY17	FY18	FY19
Revenue (INR Cr)	147,130	147,876	148,653	149,463	150,307	151,187	152,106
Cost (INR Cr)	104,610	105,140	105,692	106,268	106,868	107,494	108,147
EBITDA (INR Cr)	42,521	42,736	42,961	43,195	43,439	43,693	43,959
EBITDA %	29%	29%	29%	29%	29%	29%	29%
PBIT (INR Cr)	13,830	13,900	13,973	14,050	14,129	14,212	14,298
PBIT %	9%	9%	9%	9%	9%	9%	9%
Estimated capital employed (INR Cr)	299,103	300,619	302,199	303,845	305,561	307,350	309,218
ROCE %	5%	5%	5%	5%	5%	5%	5%
<b>Incremental impact due to spectrum policy</b>							
Opex for spectrum refarming and savings in SUC (INR Cr)	-	5,187	7,783	12,577	12,437	13,066	13,667
Adjusted EBITDA (INR Cr)	42,521	37,549	35,178	30,618	31,001	30,627	30,292
Adjusted EBITDA %	29%	25%	24%	20%	21%	20%	20%
Spectrum cost amortisation and refarming capex amortization (INR Cr)	-	6,044	6,983	12,119	14,953	15,951	19,580
Adjusted PBIT (INR Cr)	13,830	2,669	(793)	(10,646)	(13,261)	(14,806)	(18,949)
Adjusted PBIT %	9%	2%	-1%	-7%	-9%	-10%	-12%
Incremental capital employed (including spectrum costs and refarming capex) (INR Cr)	120,888	139,660	205,107	233,444	243,424	279,716	285,719
ROCE %	3%	1%	0%	-2%	-2%	-3%	-3%

Note:

- Current industry revenue is increased for higher share of no-voice revenue year on year.
- EBITDA margins and PBIT margins for the industry are assumed to remain constant at current levels over next 20 years.
- Revenue as % of capital employed in Indian telecom industry is around 49% over the few years, which is assumed to remain at 49% over next 20 years to calculate future capital employed.
- Additional impact due to policy changes is considered on and above normal business returns industry has witnessed over the years. Impact of reduction in spectrum usage charges, spectrum refarming opex, spectrum refarming capex and spectrum cost is considered over business as usual assumptions to derive impact on industry due to proposed policy changes.

FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32
153,064	154,065	155,111	156,204	157,348	158,544	159,797	161,110	162,485	163,929	165,444	167,036	168,709
108,829	109,540	110,284	111,061	111,874	112,725	113,616	114,549	115,527	116,553	117,631	118,762	119,952
44,236	44,525	44,827	45,143	45,474	45,819	46,181	46,561	46,958	47,375	47,813	48,273	48,757
29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%
14,388	14,482	14,580	14,683	14,791	14,903	15,021	15,144	15,274	15,409	15,552	15,701	15,859
9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
311,166	313,201	315,328	317,550	319,875	322,307	324,854	327,522	330,319	333,253	336,333	339,569	342,971
5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
14,377	14,773	15,607	16,131	17,028	17,761	18,751	19,787	20,876	22,019	23,219	24,479	25,802
29,859	29,752	29,220	29,013	28,446	28,059	27,430	26,773	26,082	25,356	24,594	23,794	22,955
20%	19%	19%	19%	18%	18%	17%	17%	16%	15%	15%	14%	14%
20,180	24,160	29,701	32,695	35,604	35,649	51,599	60,907	64,186	76,108	78,121	91,196	109,399
(20,169)	(24,451)	(30,728)	(34,142)	(37,841)	(38,506)	(55,329)	(65,551)	(69,788)	(82,718)	(85,788)	(99,974)	(119,342)
-13%	-16%	-20%	-22%	-24%	-24%	-35%	-41%	-43%	-50%	-52%	-60%	-71%
325,520	380,931	410,864	439,951	440,406	599,904	692,991	725,775	844,997	865,129	995,878	1,177,905	1,276,235
-3%	-4%	-4%	-5%	-5%	-4%	-5%	-6%	-6%	-7%	-6%	-7%	-7%

---

# *Notes*



# Contacts

***Mohammad Chowdhury***

Executive Director, Telecom Industry Leader, PwC India  
mohammad.chowdhury@in.pwc.com  
+91- 9167665544

***Sivarama Krishnan***

Executive Director, Risk Advisory Services, PwC India  
sivarama.krishnan@in.pwc.com  
+91- 9650788787

***Rajan S. Mathews***

Director General, Cellular Operators' Association of India  
rsmathews@coai.in  
+91- 9999473700



## ***About PwC***

PwC firms help organizations and individuals create the value they're looking for. We're a network of firms in 158 countries with close to 169,000 people who are committed to delivering quality in assurance, tax and advisory services. Tell us what matters to you and find out more by visiting us at [www.pwc.com](http://www.pwc.com).

In India, PwC ([www.pwc.com/India](http://www.pwc.com/India)) offers a comprehensive portfolio of Advisory and Tax & Regulatory services; each, in turn, presents a basket of finely defined deliverables. Network firms of PwC in India also provide services in Assurance as per the relevant rules and regulations in India.

Providing organizations with the advice they need, wherever they may be located, our highly qualified, experienced professionals, who have sound knowledge of the Indian business environment, listen to different points of view to help organizations solve their business issues and identify and maximise the opportunities they seek. Our industry specialization allows us to help co-create solutions with our clients for their sector of interest.

We are located in these cities: Ahmedabad, Bangalore, Bhubaneshwar, Chennai, Delhi NCR, Hyderabad, Kolkata, Mumbai and Pune.

This study has been commissioned by the Cellular Operators Association of India. The data used for the study has been collected from various public sources and the audited reports available with the Registrar of Companies (RoC).

This publication does not constitute professional advice. The information in this publication has been obtained or derived from sources believed by PricewaterhouseCoopers Private Limited (PwCPL) to be reliable but PwCPL does not represent that this information is accurate or complete. Any opinions or estimates contained in this publication represent the judgment of PwCPL at this time and are subject to change without notice. Readers of this publication are advised to seek their own professional advice before taking any course of action or decision, for which they are entirely responsible, based on the contents of this publication. PwCPL neither accepts or assumes any responsibility or liability to any reader of this publication in respect of the information contained within it or for any decisions readers may take or decide not to or fail to take.

© 2012 PricewaterhouseCoopers Private Limited. All rights reserved. In this document, "PwC" refers to PricewaterhouseCoopers Private Limited (a limited liability company in India), which is a member firm of PricewaterhouseCoopers International Limited (PwCIL), each member firm of which is a separate legal entity.