Telecom Regulatory Environment (TRE) assessment: Methodology and implementation results from five emerging economies*

Rohan Samarajiva, Helani Galpaya, Dimuthu Ratnadiwakara
with contributions from
Payal Malik, Divakar Goswami, Joseph Wilson, Lorraine Carlos Salazar, Malathy Knight John

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Address
LIRNE*asia*
12 Balcombe Place, Colombo 8, Sri Lanka
http://www.lirneasia.net

Author emails
samarajiva@lirne.net
galpaya@lirne.net
ratnadiwakara@lirne.net

* The paper is based on the comparative research conducted across five countries (India, Indonesia, Pakistan, Philippines and Sri Lanka) in 2006 by Payal Malik, Divakar Goswami, Joseph Wilson, Lorraine Salazar and Malathy Knight John, respectively, with input from Harsha de Silva and Helani Galpaya on improving comparability. The research design and implementation benefited greatly from in-depth discussion at the March 2006 Research Planning Meeting in Gurgaon, India, where the contributions of Tim Kelly, Sam Paltridge and Laveesh Bandari were especially noteworthy. In the conduct of the TRE research the researchers were assisted by many, with Juni Soehardjo of MASTEL in Indonesia, Hina Sarfaraz at the Lahore University of Management Sciences, Mary Grace Mirandilla in the Philippines, and Dilani Hirimuthugodage and Jeevani Kapugama of the Institute of Policy Studies Sri Lanka, deserving special mention. The helpful comments made by George Sciadas and M. Arif Sargana on a previous draft prepared for the CPRsouth1 conference, Manila, Philippines, 19-21 January 2007, and by representatives of the regulatory agencies of Indonesia, Philippines, Thailand and India at the WDR Expert Forum, Singapore, 2-3 March 2007, are gratefully acknowledged. Any remaining errors are the responsibility of the authors.

1.0 Introduction

The desired objective of telecom policy reform and regulation is improved sector performance, measured in four dimensions: connectivity, price, quality of service and choice.

Investment is a necessary condition for sector performance.

Risk is the primary determinant in making the investment decision – higher the risk, higher the expected rate of return. At the point of investment, investors consider risks associated with three environments:

- Macro-level or country
- Market or commercial, and
- Regulatory

The macro-level or country risk is defined as factors that may affect the entire economy, such as inflation and foreign exchange risk, as well as overall political stability. Commercial risk is comprised of factors such as demand, effect of substitutable products and services, and performance of competitors. Regulatory risk is a term of art, defined by Spiller and Levy (1994) to refer to risk emanating from government action, including but not limited to the actions of the actual sector-specific regulatory agency with authority over the industry in question.

Risk is partially a matter of objective analysis - an investor can calculate an expected rate of return on a new investment based on factors within his control and assumptions based on factors outside his control. However, risk is, to a great extent, also matter of perception. Macro-level/Country Risk and as Regulator Risk are both difficult to measure objectively. But at a minimum a subjective measure of both Country Risk and Regulatory Risk is a necessity in making the investment.

The scope of this paper is the regulatory environment within which telecom operators and potential new entrants function, that is, a subset of the overall Regulatory Risk environment here described as the "Telecom Regulatory Environment" (TRE) that includes only the telecom-specific aspects. The purpose of the paper is to present a tool to measure the TRE in a country.

The TRE tool presented here is a measure of perception that is affected by a number of different factors. For example, the context of the investment (new vs. incremental) and nature of the telecom sub-sector (mobile vs. fixed) will affect the perception of the TRE.

The TRE has many uses: it is a diagnostic instrument for assessing the performance of the laws affecting the telecom sector and the various government entities responsible for implementation. If the scores are low in one aspect against another, it may be that the regulatory performance needs to be improved. If the performance considered satisfactory, it may also be possible that the problem is the communication of the regulatory actions. If the latter conclusion is reached, the appropriate action would be to improve the way the agency communicates its actions. The TRE can also be used as a tool for investors to assess regulatory risk in a country. Particularly for investors facing investment opportunities in the telecom sectors of more than one country, the TRE can provide a ranking of the countries in terms of telecom-specific regulatory risk.

This paper presents the methodology and illustrates its application using a six-country assessment completed in mid-2006.

2.0 Related work

The ECTA[1] Regulatory Scorecard for European Union countries launched in 2004 is the closest to the present work, though not prior and possibly influenced by the original publication on TRE (Samarajiva and Dokeniya, 2003), though unacknowledged.[2] Like the original TRE study it took the following as its starting point:

> Telecom policy and regulatory decisions clearly have an impact on the investment climate and investment opportunities in the industry during both boom and bust cycles. We know from experience that credible (i.e. competent, objective, transparent and accountable) regulation is a great attraction for new investment. Indeed most decisions by regulators affect the investment climate in their countries. (Melody, 2003).

The ECTA instrument, first implemented in 2004 and repeated in 2005 and 2006, is based on three key components: 1) the overall institutional environment, 2) the general market access conditions and 3) the regulatory effectiveness and competitiveness in four key access markets and services. The criteria were selected from a number of different inputs including the Reference Paper from the Fourth Protocol of the GATS (as in the TRE) and the EU regulatory framework. The latest version of the regulatory scorecard implemented in 2006 has 97 questions that are distributed across the three components.[3]

ECTA's regulatory scorecard, although quite comprehensive in its coverage, cannot be implemented outside the EU. It is designed to be implemented in a region where countries share a common legal and institutional framework. This requirement cannot be satisfied outside the EU region. The questions are specifically tailored to the legal and institutional arrangement existing in the EU countries. For example, countries are scored on the basis of how quickly they transpose the EU regulatory framework into their national legislation or how quickly the National Regulatory Agencies have conducted the Significant Market Power analysis. Furthermore, the large number of questions will probably yield poor response rates in most countries.

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[1] Representing new entrant operators, ISPs and suppliers of ICT products and services for the European Union.

[2] Discussion Paper 0303a, which did not include the pilot study was posted on 11 March 2003, but is no longer on the World Dialogue on Regulation website due to a reorganization (http://www.regulateonline.org/2003/dp/draftpapers.htm); Discussion Paper 0303b, with the annex containing the pilot study, was posted in September 2004. The fact that ECTA read Background Paper 0301, which was posted right next to 0303, prior to designing the instrument used in 2004 is clear. It is reasonable to assume that they also read 0303.

[3] Available at: http://www.ectaportal.com/en/upload/File/Regulatory%20Scorecards/ECTA%20Regulatory%20Scorecard%202006%20V2%5B1%5D.0.zip

Most of the questions in the scorecard deal with objective measures that assess whether certain regulatory measures or market conditions exist in the country being surveyed. However, ECTA's scorecard has been critiqued by some for being subjective in the manner in which weights are assigned[4] and in the assessment of regulation in the key markets (Weeks and Williamson, 2006; Edwards and Waverman, 2006). Weeks and Williamson (2006) also critique the ECTA scorecard for conflating *more* regulation with *effective* regulation without considering the level of competition in the particular market.

The literature includes another initiative to benchmark regulatory performance: a one-time assessment of recently established NRAs in the Middle East (Mustafa, 2002). Mustafa (2002) does not use scores but instead assesses NRAs in the Middle East against a checklist that he proposes. For example, the checklist asks whether a country has adopted new telecom legislation, whether it has licensed new operators, whether the regulatory body is sector specific, etc. The checklist will be accepted by those who agree with Mustafa's view of regulation but does not have the international legitimacy enjoyed by the GATS Protocol 4 Reference Paper, a document that was painstakingly negotiated and now enjoys the voluntary adherence of a substantial number of the world's nations, constituting the broadest international consensus on telecom regulation.[5] Further, because the checklist does not use scores, it is not very useful for tracking relative performance of NRAs over time or across regions.

The TRE assessment has been developed in a manner that can be universally deployed, irrespective of the specific regulatory or institutional framework that may exist in a particular country. It is parsimoniously designed in order to elicit good response rates from senior executives and equivalent persons for robust assessment. And finally, the TRE scores allow countries to be benchmarked over time to track the relative improvement (or deterioration) of the regulatory environment in the selected countries.

3.0 Method

The original TRE instrument was designed to assess regulatory effects on investment (Samarajiva & Dokeniya, 2005). It asked stakeholders to assess the telecom regulatory environment across five dimensions for the fixed and mobile sectors. The dimensions were adapted from the Reference Paper of the Fourth Protocol of the General Agreement on Trade in Services,[6] substituting the universal service dimension with price or tariff regulation, and leaving out independence of the regulator, because the latter was seen as a process variable different from the other outcome variables. Following the conduct of a pilot and a research planning meeting, a decision was made to restore the universal service dimension, increasing the number of dimensions to six, and the total number of items that required a

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[4] For example, while scoring disputes settlement, the scorecard assigns a lower weight to "due process" (10%) than "speed of process" (40%), when the former rather than the latter may be more important to the end result (Weeks and Williamson 2006).

[5] Results of the basic telecommunications negotiations. http://www.wto.int/english/tratop_e/serv_e/telecom_e/telecom_results_e.htm#fntext3

[6] http://www.wto.int/english/tratop_e/serv_e/telecom_e/tel23_e.htm

response to 12. Considerable effort was made to be parsimonious because the ideal respondents were senior managers, including CEOs of operators; a lengthy questionnaire would run the risk of it being passed down to others to complete.

The respondents were asked to rate the quality of the regulatory environment for each dimension on a Likert scale ranging from 1 (highly ineffective) to 5 (highly effective). Posing questions in this format ensures that responses can be easily analyzed without losing any qualitative information as often occurs when using open ended questions.

Based on the lessons of the pilot, it was decided that the instrument would be administered at the same time in six countries by a team of researchers. Each instrument would be accompanied by a short narrative statement describing each of the dimensions, using language from the Reference Paper as much as possible, and a bland summary of significant telecom policy and regulatory actions taken within the previous 12 months (see Annex B and Annex C for examples). It was accompanied by a cover letter stating that participation would be voluntary and that respondent confidentiality was guaranteed. Questionnaires were to be sent to over 50 respondents from previously agreed-upon categories. Follow-up emails, phone calls and meetings were made to ensure a high response rate.

The surveyed stakeholders (respondents) may be seen as falling into one of four categories.

- Category 1 : Respondents from the industry that is being regulated, such as operators, industry association and equipment suppliers
- Category 2 : Respondents whose business is linked to performance of the industry, such as financial institutions, private investment houses, banks and credit rating agencies
- Category 3 : Respondents who evaluate the sector such as educational and research organizations, telecom consultants and law firms
- Category 4 : Respondents from civil society that are composed of users and encompass public interest rather than private interest such as journalists, telecom user groups, civil society organizations, former members of regulatory, other government agencies and donors

The sample selection procedure used in this study does not, by itself, produce equal numbers of respondents from each category, because response rates will differ. Different number of respondents in each category will result in over-representation of some categories and under-representation of others. This will cause problems in comparison.

Ideally each category should make the same contribution to the final result. In order to achieve this balanced representation, over-represented categories are given a weight of less than one and under-represented categories are given a weight of greater than one, in such a way that all four categories equally contribute (25% each) to the final score.

Table 1 summarizes the size of each category and the assigned weights across the five countries.

Table 1: Composition of respondents by category and country, and assigned weights

	Pakistan		India		Indonesia		Sri Lanka		Philippines	
	Number of Respondents	Weight	Number of Respondents	Weight	Number of Respondents	Weight	Number of Respondents	Weight	Number of Respondents	Weight
Category 1	14	0.71	16	0.78	40	0.37	21	1.20	19	0.68
Category 2	2	5.00	4	3.13	2	7.38	17	1.49	2	6.5
Category 3	16	0.63	16	0.78	11	1.34	21	1.20	16	0.81
Category 4	8	1.25	14	0.89	6	2.46	42	0.60	15	0.87

Source: Research team

4.0 Findings

The findings of the survey conducted simultaneously in five countries in 2006 are presented here.[7] The results for the two sub-sectors (fixed and mobile) are presented separately. In all figures, the average score (5 being best and 1 being worst) is rounded to one decimal point only. The countries are ordered by per capita GNI (purchasing power parity), with Pakistan being the lowest and Philippines the highest. The midpoint of 3 is considered the threshold of satisfactory performance.

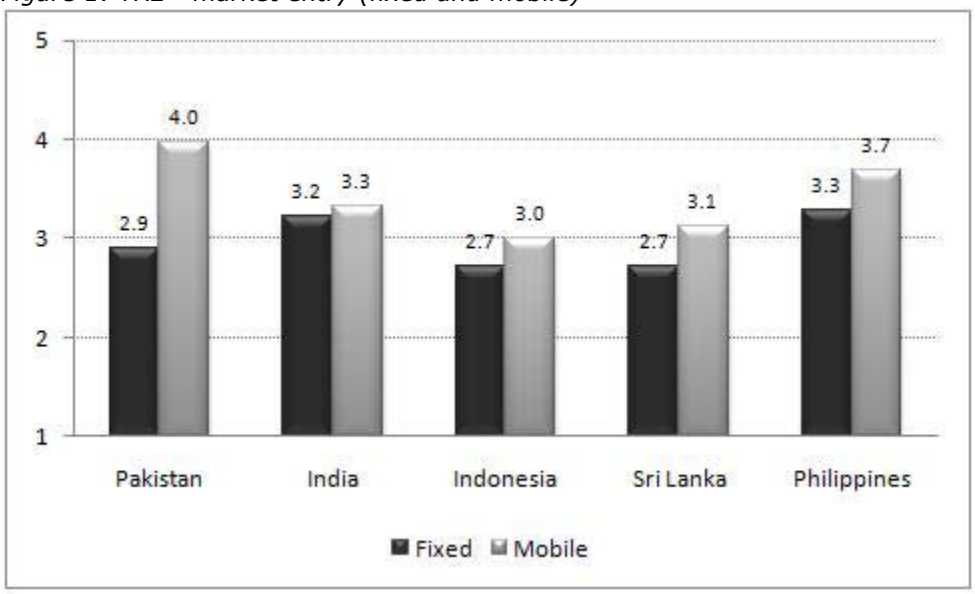
A detailed explanation of the results is not within the scope of this paper since its purposes are to present the TRE methodology and illustrate its use. However, in presenting the results of the 2006 study below, a brief analysis of the results is presented in light of ongoing reforms.

4.1 Market Entry

Figure 1 shows that mobile TRE on the market-entry dimension (primarily dealing with licensing) is higher than Fixed TRE in all cases. Market Entry is the dimension that is most strongly connected to the overall policy setting, and received the highest scores among the six dimensions with the average for fixed being 3.0/5 and the average for mobile being 3.4/5. Pakistan and the Philippines received higher mobile scores than the other countries.

[7] Thailand was studied, but was excluded at the analysis stage for two reasons: its very low scores may have been influenced by the Shinwatara telecom scandal that was at the peak at the time the assessment was conducted; in addition, the number of respondents was the lowest among the six countries, making statistical correction problematic.

Figure 1: TRE - market entry (fixed and mobile)



Source: Research team

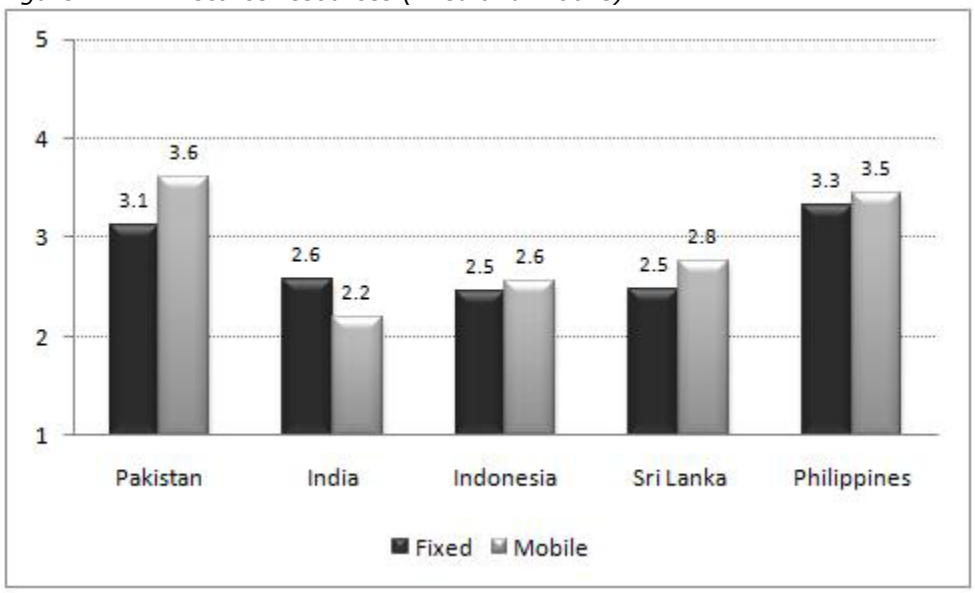
The market entry criteria for a potential new entrant into Pakistan's mobile sector are transparent and certain: the procedure is clear, fees are clearly stated, and any new entrant that satisfies the conditions can obtain he license without need for special permission or favors. The transparency and certainty appear to be rewarded by high TRE scores.

The Philippines' high score in the fixed sector appears somewhat contradictory in light of the extremely heavily regulated and cumbersome process of obtaining a license that traditionally requires a new entrant to obtain a congressional franchise. However at least two hypotheses can be formulated by way of explanation. One is that it is possible that the recent relaxing of the congressional franchise requirement from entrants into the value added or VOIP markets had created a positive impression amongst the respondent group. On the other hand, it is possible that even though the licensing procedure is cumbersome, they are at least very clearly stated and known (Carlos-Salazar, 2007). Therefore the only reasonable option available to a potential entrant is to buy (obtain a stake in) an existing company. Investing in an exiting operation enables the investor to analyze the associated risks based on objective financial performance criteria (instead of subjective and often unquantifiable risk posed in obtaining a new license) and enables him to not be negatively affected by the TRE with regard to Market Entry. Clearly further study is required to test these two hypotheses.

4.2 Scarce Resources

Though scarce resources were defined as spectrum, rights of way and numbering, spectrum is the likely to have been the dominant aspect considered by respondents when responding to the questionnaire. Here the mobile TRE is higher than fixed in all countries except India, which also receives the lowest scores on this dimension (Figure 2). Again, Pakistan and the Philippines have significantly higher scores. Overall performance is weak, with only Pakistan and the Philippines scoring above the threshold.

Figure 2: TRE - scarce resources (fixed and mobile)



Source: Research team

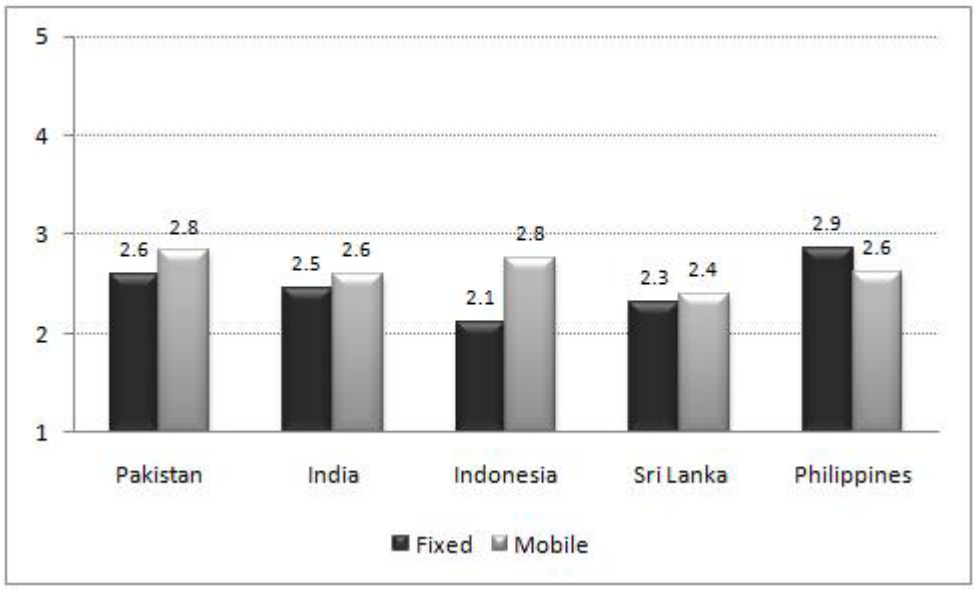
Once again Pakistan is at the top of the set. Among other things, this can be attributed to the fact that the de-regulation policy requires the Frequency Allocation Board to process applications for spectrum within a period of 30 days.

This is in contrast to the lowest scores received by India. Despite several attempts by the regulator and various task forces, consultations and the making of promising recommendations, there is still no procedure for economic allocation of spectrum (Malik, 2007). The purely administrative allocation of spectrum lacks procedural transparency and increases financial uncertainty for investors. Lack of spectrum is a real problem in India - most Indian GSM operators have exhausted their allocated spectrum well beyond benchmark levels, while CDMA operators are also close to reaching this point (BDA, 2007).

4.3 Interconnection

The overall performance in interconnection is quite weak in all countries with average scores of 2.5 and 2.7 for fixed and mobile respectively as shown in Figure 3. The Philippines stands out by having superior interconnection TRE for fixed than for mobile.

Figure 3: TRE – Interconnection (fixed and mobile)

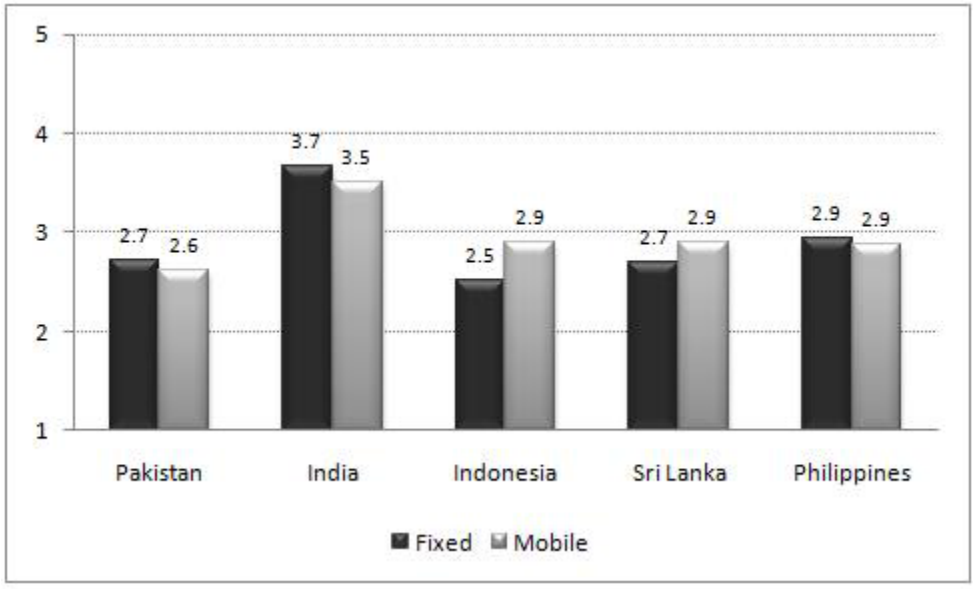


Source: Research team

4.4 Tariff Regulation

Here, India stands out (Figure 4).

Figure 4: TRE – Price/Tariff Regulation (fixed and mobile)



Source: Research team

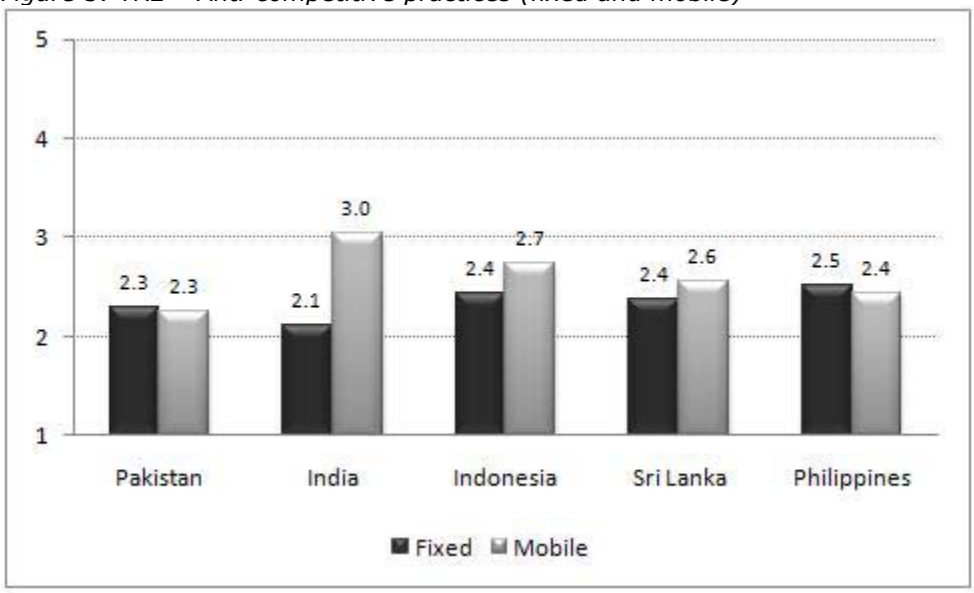
Interestingly, since 2002, the Indian regulator (TRAI) has forborne from prescribing cellular tariffs (Malik, 2007). At the same time, due to high levels of competition, India enjoys some of the lowest mobile prices in the region, calculated using the OECD's price-basket methodology (Iqbal, 2007). Even more importantly most people believe that India has the lowest mobile prices in the world, even if this is not

exactly true (Iqbal, 2007). The forbearance of the regulator with regards to tariffs seems have been rewarded with high TRE scores.

4.5 Anti-competitive practices

Nearly all countries record a poor showing, almost uniformly failing to exceed the threshold in the regulation of anti-competitive practices (Figure 5). The one exception is India's mobile TRE which just reaches the threshold. The rather large gap between India's mobile and fixed scores is somewhat puzzling. It may be attributed to the fact that there was no incumbent participation in the mobile sector at the outset, while there have been many controversies regarding the overly protective attitude of the government and the regulator with regard to the fixed incumbent, BSNL (Malik 2007).

Figure 5: TRE – Anti-competitive practices (fixed and mobile)

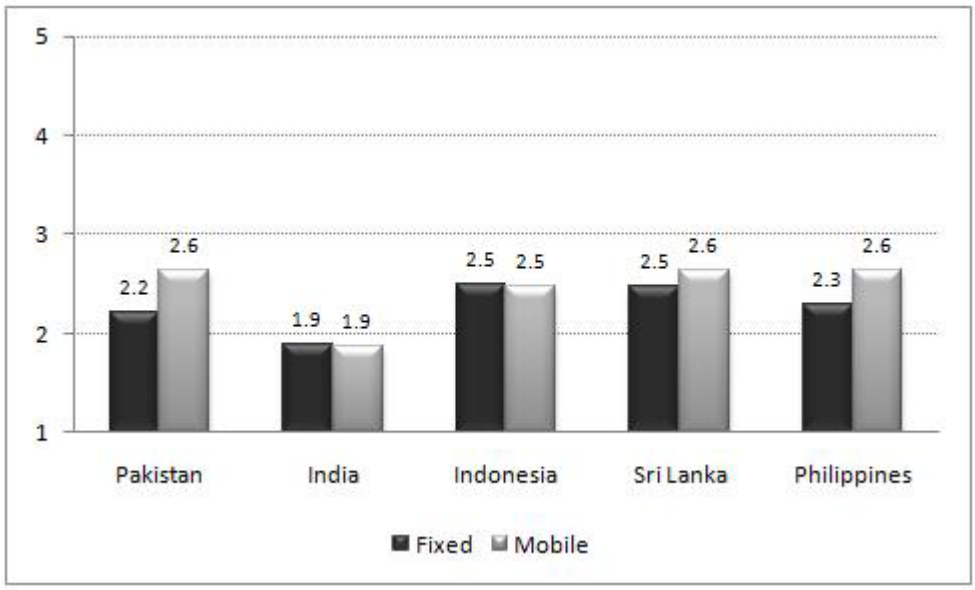


Source: Research team

4.6 Universal Service

Universal service was the dimension that attracted the fewest responses. The overall results were the lowest of the six dimensions, with India receiving the lowest scores for fixed and mobile (Figure 6). India also receives its lowest score across 6 dimensions in Universal Service.

Figure 6: TRE – Universal service (fixed and mobile)



Source: Research team

Ironically, India which scores the lowest has the world's second largest universal service obligation fund. The dismal TRE for India on this dimension may be attributed to the disbursement of rural telecom subsidies in India which resulted in the dominant incumbent BSNL receiving the lion's share (Malik, forthcoming).

Sri Lanka, a country with minimal universal service activity, scored highest in fixed and was in the top three in mobile.

As was the case with price regulation, the respondents appear to think that less is more with regard to universal service.

4.7 Aggregate Performance

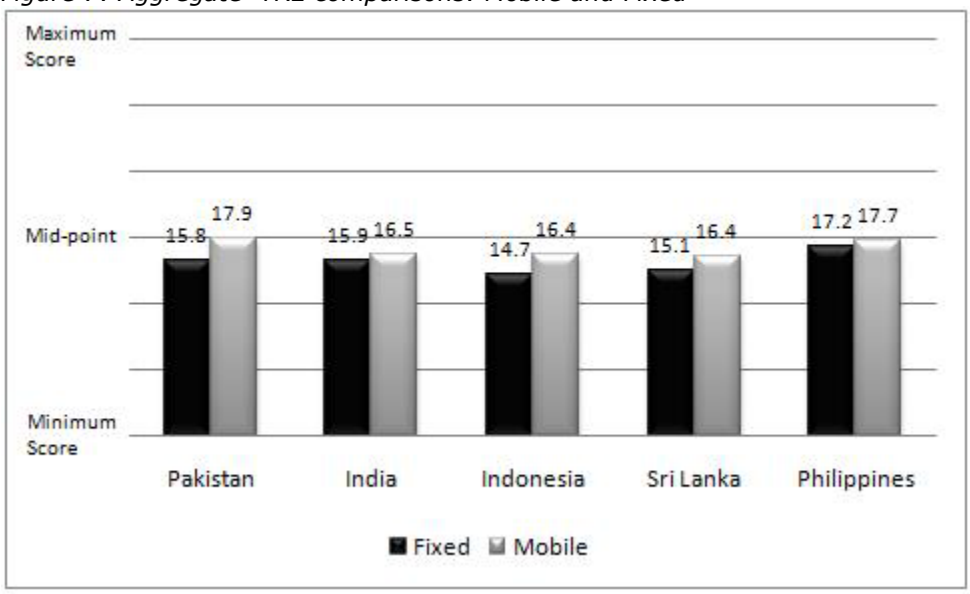
Figure 7 shows the aggregate performance of the six countries on TRE in the mobile and fixed sectors. Based on relatively good performance across all dimensions, both Pakistan and Philippines make it to the top three. With high performance in price regulation overcoming poor performance in scarce resources and universal service, India also makes it to the top three. These three countries make the top tier in both fixed and mobile sectors.

The midpoint of 18 (between the lowest possible aggregate score of 6 and the highest possible aggregate score of 30) can be considered the threshold of good performance.

All countries show room for considerable improvement, with no one exceeding the threshold. Even the highest scores for mobile and fixed (17.9/30 for Pakistan and 17.6/30 for Pakistan respectively) miss the threshold, albeit by small margins.

The mobile aggregates are higher than fixed in all cases. The average fixed aggregate is 15.8/30 and the average mobile aggregate is 16.7/30.

Figure 7: Aggregate TRE comparisons: Mobile and Fixed



Source: Research team

Pakistan's overall performance may be analyzed in light of developments that took place in the recent past. Pakistan undertook major sector reforms based on a new policy framework in 2003-2004 and followed through with concerted and coherent regulatory actions through a well-resourced and empowered regulatory agency with a strong leader. Five of the six dimensions of TRE were under the control of the Pakistan Telecom Authority (PTA), which plays a strong role in policy as well. Its decisions have not been subject to litigation, appeal and reversal by government, unlike in the other countries in the set.

5.0 Discussion

5.1 The importance of each respondent Category

The methodology gives equal importance to each category. But in a survey of this type it is not possible to guarantee that each category receives an equal number of responses. Therefore weighting is required. Annex A provides a straightforward method for calculating the weights. Specific weights assigned to the 2006 data are presented in *Annex 1*.

5.2 The number of respondents

Even though weighting deals with numerical imbalance, it is important to have sufficient number of respondents for all four categories because the sample size determines the precision (a measure of how consistently the result is determined by repeated determinations without reference to any "true" value) with which population values can be estimated; i.e., larger the sample, the more precise the estimate. As a practical matter, sample size is often the dominant factor in determining the precision. Very few respondents from a particular category will make the final TRE score highly sensitive to each respondent's input in that category.

Having taken the above factors as well as the practical constraints associated with the survey in to account, it is recommended to have a minimum of 10 respondents from each category.

Having a larger number of respondents per category also allows more sophisticated analysis without compromising the respondent's anonymity. For example, Category 1 represents players who are already in the market. Certain regulatory regimes may unduly favor those who have already passed (by what ever means) the barrier to entry. For these respondents, overly cumbersome market entry procedures may indeed serve as a positive and keep new entrants out. However to analyze at the level of respondent categories, a larger data set is required.

5.3 Scale

The raw data collected for this survey using the Likert scale are ordinal data and therefore the distinction between neighboring points on the scale is not necessarily always the same. For instance, the difference in effectiveness expressed by giving a score of 4 rather than 3 might be much less than the difference in effectiveness expressed by giving a score of 5 rather than 4.

Since the ordinal data collected are summarized in to final TRE scores, it is possible to transform the 1 to 5 scale to a different scale like -2 to 2 which makes it easier to interpret. However, there is a possibility that a transformed scale portraying a different level of perception to the respondent. For example giving a score of 3 in a 1 to 5 scale and giving a score of 0 in a -2 to 2 scale might not appear the same for some respondents. Therefore it is recommended to use a consistent scale in all TRE surveys, especially if analysis is done using results of more than one TRE survey.

However, the Likert scale may be subject to distortion from couple of causes. Respondents may avoid extreme scores (*central tendency bias*); or try to portray themselves or their organization in a more favorable light (*social desirability bias*).

5.4 Analysis of current results:

The results show that the hallmarks of good regulatory performance such as independence, transparency, consistency, pro-competitiveness are perceived positively and rewarded by high TRE scores. Pakistan (high overall TRE) and India (high TRE in price regulation) are examples. On the flip side, the results show that very heavy handed approaches towards regulation (as employed by India with regard to Universal Service fund disbursement) are not perceived positively and yield low TRE scores.

For investors, all else being equal, a higher TRE score should mean a lower risk emanating from the regulatory actions/inactions. Therefore in assessing investment opportunities in two (otherwise equal) countries, an investor can choose the country with the higher TRE score. As an example, the survey results give Pakistan a higher TRE score than India. During the time 2005-2006 (the same time period as the TRE survey) foreign direct investment (FDI) inflows into Pakistan and India were USD 0.721 billion and USD 0.20 billion respectively – Pakistan receiving 36 times more

FDI than India.[8] However this analysis only touches the surface - current perceptions of the TRE are always relative to what existed previously. Therefore we need to examine the *change* in the TRE scores from one year to the next, and identify the relationship between the change in TRE and investment. Several consecutive years of TRE results are needed for this analysis.

The TRE is also a tool for policy makers and regulators. All else remaining constant, the "right" actions by the regulator will result in increased TRE scores, and be rewarded by higher investment and better sector performance. Once again, with TRE score time series, it will be possible to analyze the relationship between changes in TRE scores and sector performance.

The Digital Opportunity Index (DOI) is used by the ITU as composite measure of sector performance. Referring to the TRE, the ITU (2007) states that:

> Their evaluation of the regulatory environment is in general agreement with sector performance, as measured by the DOI. However, the fit is not perfect: for instance, Sri Lanka actually gained two places in the DOI, but it lagged behind, ranked fourth out of the six countries in regulatory performance. This suggests lags in relating changes in the regulatory environment to sector performance

Indeed there is a lag between perception and investment, and there is lag between investment and sector performance. This lag is most likely different for fixed and mobile. Further investigation is needed on this matter. It is important to keep this in mind in future work that analyzes the relationship between TRE and sector performance.

5.5 The number of dimensions

The desirability of adding the dimensions of consumer protection and/or quality-of-service regulation to the current six dimensions has been raised, and needs to be considered in designing future studies. However, increasing the number of questions can lower the yield of completed questionnaires. Furthermore, too much deviation from the core measures in the GATS Fourth Protocol Reference Paper has implications for general application that must be considered.

5.6 Separation of fixed and mobile sub-sectors

The TRE currently deals separately with the fixed and mobile sectors. The correctness of this decision is indicated by the significantly different scores received for the two sectors in the 2006 survey. However, it has been argued that with increased fixed-mobile convergence, this separation by sector will become irrelevant. This is indeed something to keep in mind for future surveys. But at the present time

[8] The FDI figure for Pakistan quoted here does not include the roughly USD 1.8 billion that was a one-time inflow into the country by Etisalat for a share of the incumbent Pakistan Telecommunication Company Limited (PTCL) that was privatized in 2005-2006. The difference between FDI flows between the two countries would be higher if this figure was included. Per capita comparison would also exacerbate the gap. It must be recognized, however, that FDI is not the end-all. India generates significant domestic investment compared to the region. Yet, low penetration of India versus Pakistan shows that not enough is being invested in the sector.

and for the very near future, the regulatory environments (at least in developing Asia) are different and will have to be treated as such. Indeed, the convergence of fixed and mobile TRE scores will be one of the best pieces of evidence on actual (as opposed to wishful) fixed-mobile convergence.

5.7 TRE for broadband and/or Internet

Significant attention is being given in policy discourse to the roll-out and adoption of various broadband technologies in developing Asia, especially as a means of bridging the digital divide. However, research shows that awareness, let alone access, to the Internet is at very low levels in most of South Asia and South East Asia, especially at the bottom of the pyramid (LIRNEasia, 2006). Impediments to the development of broadband networks may be caused by the regulatory environment. If that is the case measuring the TRE with regard to broadband access might be important, at least in order to convey to policy makers the perceptions of potential investors. Including broadband as a sub-sector (in addition to mobile and fixed) in future TREs may be advisable.

5.8 Repeating TRE over time, increasing coverage

The value of the TRE as tool for decision making increases if time series are available. Therefore the most important task is to repeat the TRE in the five countries that were studied in 2005. Efforts need to be made to keep consistent the composition of the respondent panel in terms of the broad categories given in *Table 1* for greater comparability of results across the countries.

The value of the TRE is also creased by increasing the country coverage. The TRE is currently being piloted in several countries Latin America and Africa and the 2008 survey being planned by LIRNE*asia* will include several Asian countries not included in 2006.

5.9 Adding objective measures

Although ECTA's Regulatory Scorecard cannot be implemented in other countries as it is structured, it may be possible to supplement the TRE with some "objective" measures similar to those in ECTA's scorecard. For example, measures of regulator's internal efficiency, transparency of decision-making process, general market access conditions etc. may be captured in a carefully designed "balanced scorecard." The advantage of balanced scorecards is that they minimize information overload and allow decision-makers to gauge outcomes from complex processes (Kaplan and Norton 1992).

6.0 Conclusion

The paper presented the methodology and the results obtained by applying the TRE tool in 5 countries.

The TRE is a useful tool for investors, especially those that have a choice in investing in more than one country. Changes in the TRE over time can be used as a useful indicator of regulatory risk. Though preliminary evidence on the relationship between investment and TRE was presented, further investigation can only be done after obtaining several consecutive TRE scores.

The TRE is also a tool for regulators/policy makers. Further investigation is required, but early indications are that increased TREs are related to better sector performance as measured by the DOI, albeit with a time lag. If the regulator is taking all the "right" actions but is receiving low TRE scores, it could hint at flaws in the regulators communication strategy – after all, TRE is a measure of perception, and better communications with stakeholders can help improve perception.

Goswami & Malik (2007) analyze the TREs and sector performance for Indonesia and India and show that despite good TRE scores relative to Indonesia, a key component of India's sector performance as measured by mobile and fixed lines per 100 people lags behind significantly. However, they conclude that Indonesia's good performance (in spite of poor regulatory environment) is likely to be the exception rather than the rule.

There have been many efforts to improve regulation of the telecom sectors, and many academic writers have written about the subject. However, there has been no easy way to measure the efficacy of regulatory reforms. A regulator who wishes to demonstrate good performance has had to rely on anecdotal evidence or over-reach to claim authorship of improved sector performance. Investors wishing to assess the regulatory environment specific to the telecom sector have had to rely on regulatory provisions as enacted (as opposed to practiced) and "industry gossip." The TRE instrument promises to fill this lacuna.

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Annex A - Assignment of Weights

The final outcome of the survey is twelve responses across six dimensions for both fixed and mobile regulatory environments.

All the responses are weighted before calculating the final score in order to ensure that each respondent category affected by the regulatory practices in the country has an equal influence in the final score.

Calculation of weights

The weight for a category is calculated by dividing the total number of respondents in all the categories by 4 and dividing the result by the number of respondents in that category.

I.e. if the total number of respondents in the sample is T and number of respondents in category 1, category 2, category 3 and category 4 are c1, c2, c3 and c4 respectively,

Weight for category 1 (w1) = T/(4*c1)
Weight for category 2 (w2) = T/(4*c2)
Weight for category 3 (w3) = T/(4*c3)
Weight for category 4 (w4) = T/(4*c4)

Weighting the responses

Next, the scores given by respondents are multiplied by the corresponding weight value calculated in Step 1. All the responses of category 1 respondents are multiplied by the weight of category 1 (w1) and responses of category 2 respondents by the weight of category 2 (w2) and so on.

Calculation of the final score

The final score for each dimension is the simple average of the weighted responses of that dimension.

Annex B - Questionnaire

Telecom Regulatory Environment

You are kindly requested to make your frank assessments of the telecom regulatory environment (TRE) for the past 12 months (June 2005 – June 2006) for the fixed and mobile telecom sectors on a five-point scale. This should take less than 5 minutes of your time.

The dimensions used in this questionnaire are broadly based on the WTO Regulatory Reference Paper (GATS Protocol 4) and are briefly described below.

A fact-sheet of key events in the Telecom Regulatory Environment is attached for your reference for the period June 2005 – June 2006.

Dimension	**Aspects Covered**
Market Entry	Transparency of licensing. Applicants should know the terms, conditions, criteria and length of time needed to reach a decision on their application. License conditions. Exclusivity issues.
Scarce Resources	Timely, transparent and non-discriminatory access to spectrum allocation. Numbering and rights of way: frequency allocation, telephone number allocation, tower location rights.
Interconnection	Interconnection with a major operator should be ensured at any technically feasible point in the network. Quality of interconnection comparable to similar services offered by own network. Reasonable rates for interconnection. Unbundling of interconnection. Interconnection offered without delay. Sharing of incoming and outgoing IDD revenue. Payment for cost of interconnection links and switch interface. Payment for cost of technical disruption of interconnection.
Tariff Regulation	Regulation of tariffs charged from consumers.
Regulation of Anti Competitive Practices	Anti-competitive cross subsidization. Using information obtained from competitors with anti-competitive results. Not making technical information about essential facilities and commercially relevant information available to competitors on a timely basis. Excessive prices. Price discrimination and predatory low pricing. Refusal to deal with operators and other parties. Vertical restraints. Technical disruption of interconnection. Sharing of towers and facilities by parent company and subsidiaries in different segments of the market.
Universal Service Obligation (USO)	Administration of the universal service program/fund in a transparent, non-discriminatory and competitively neutral manner and is not more burdensome than necessary for the kind of universal service defined by the policymakers.

Please **CIRCLE** the number that best represents the quality of the regulatory environment for each dimension. The *lower* number represents **Highly Ineffective** and the *higher* number represents **Highly Effective.**

FIXED SECTOR: REGULATORY ENVIRONMENT
Period June 2005-June 2006

Dimensions

Market Entry	**Highly ineffective** 1 2 3 4 5 **Highly effective**
Access to Scarce Resources	**Highly ineffective** 1 2 3 4 5 **Highly effective**
Interconnection	**Highly ineffective** 1 2 3 4 5 **Highly effective**
Tariff Regulation	**Highly ineffective** 1 2 3 4 5 **Highly effective**
Regulation of Anti-competitive Practices	**Highly ineffective** 1 2 3 4 5 **Highly effective**
Universal Service Obligation (USO)	**Highly ineffective** 1 2 3 4 5 **Highly effective**

Comments:

Please **CIRCLE** the number that best represents the quality of the regulatory environment for each dimension. The *lower* number represents **Highly Ineffective** and the *higher* number represents **Highly Effective.**

MOBILE SECTOR: REGULATORY ENVIRONMENT
Period June 2005-June 2006

Dimensions

Market Entry	**Highly ineffective**	1	2	3	4	5 **Highly effective**
Access to Scarce Resources	**Highly ineffective**	1	2	3	4	5 **Highly effective**
Interconnection	**Highly ineffective**	1	2	3	4	5 **Highly effective**
Tariff Regulation	**Highly ineffective**	1	2	3	4	5 **Highly effective**
Regulation of Anti-competitive Practices	**Highly ineffective**	1	2	3	4	5 **Highly effective**
Universal Service Obligation (USO)	**Highly ineffective**	1	2	3	4	5 **Highly effective**

Comments:

Annex C – Fact Sheet/Description of regulatory developments in the country

A fact sheet/description of regulatory events over the past 12 months is sent out as part of the questionnaire. The description used to survey respondents in India is given here. Similar descriptions were sent respondents in the other 4 countries.

Key Regulatory Events- June 2005-June 2006

Date	Subject
2006	
27 June	Study Paper on Financial analysis of Telecom Industry of China and India.
16 June	Consultation Paper On Admissibility of Revenue Share between Visiting Network and Terminating Network for Roaming Calls. The key issue in this paper is that in case of roaming, whether the terminating network service provider should get only the prescribed termination charges or in view of higher roaming charges, should there be any revenue share arrangement between the visiting network service provider and the terminating network service provider.
13 June	Consultation Paper on Interconnect Usage Charges (IUC) for Short Message Service (SMS). This consultation paper mainly discusses the need for regulatory intervention for Interconnect usage charges, specifically for SMS carriage and termination charges.
12 June	Consultation paper on Allocation and pricing of spectrum for 3G services and Broadband Wireless Access. This paper discusses 3G spectrum allocation and pricing related issues, issues related to spectrum for Broadband Wireless Access. These technologies hold great potential for the rapid and comparatively inexpensive deployment of broadband services especially in rural India.
6 June	Proposed amendments in the Cable Television Networks (Regulation) Act, 1995 and the existing Telecom Licenses for facilitation of growth of IPTV services
24 May	Consultation Paper on Fixing the Benchmarks pertaining to Quality of Service for Broadband. This paper discusses the various issues relating to Broadband Quality of Service parameters, the international practices, various broadband access technologies and also suggests various Quality of Service parameters for Broadband and their benchmarks.
21 April	Consultation Paper on Issues relating to Commercial Tariff.
21 March	The Telecommunication Tariff (Forty third Amendment) Order 2006 (3 of 2006).
21 March	Regulation on Code of Practice for Metering and Billing Accuracy. http://www.trai.gov.in/trai/upload/Regulations/44/regu21mar06.pdf
20 March	TRAI releases Recommendations on Next Generation Networks (NGN)
10 March	The Telecommunication Interconnection Usage Charges (Seventh Amendment) Regulation (2 of 2006) In Schedule III of The Telecommunication Interconnection Usage Charges Regulation, 2003 (4 of 2003), the following entries shall substitute the existing entries relating to paragraph 3.2.2:- 3.2.2 For calculating ADC , Adjusted Gross Revenue shall have the same meaning as given in the respective licenses; PROVIDED that in calculating the ADC as a percentage of Adjusted Gross

	Revenue (AGR) of a Universal Access Service Licensee/Basic Service Operator, the revenue from Rural Fixed Wireline subscribers shall be excluded."
8 March	TRAI provides its recommendations on mobile number portability: Mobile Number Portability implementation process should be initiated in our country. A time frame of 12 months between the acceptance of recommendation by the Government and launch of this facility is recommended. It is recommended that this facility should be available to mobile subscribers tentatively by 1st April 2007.
7 March	The Telecommunication (Broadcasting and Cable) Services (Second) Tariff (fourth Amendment) Order 2006 (1 of 2006). To give effect to this a Tariff Amendment Order has been issued in which the words Ordinary Cable Subscriber, Commercial Cable Subscriber has been defined and the definition of 'charges' has been amended and a new clause to give effect to the relevant date for determining the ceiling in respect of commercial cable subscriber has been introduced. The proposed amendment is intended to be a short-term measure and would be reviewed on the basis of detailed examination as indicated in para 3.
27 Feb.	Direction to Mobile Service providers in the States of Maharashtra, Tamil Nadu, West Bengal and Uttar Pradesh not to charge differential tariffs for calls terminating in BSNL network and other service providers networks
23 Feb	The Telecommunication Interconnection Usage Charges (Sixth Amendment) Regulation 2006 (1 of 2006) **Salient features** • The total amount of ADC shall be reduced to Rs.3335 crore and estimated ADC for BSNL would be Rs. 3,200 crore. Substantial reduction (about 33%) in the amount of ADC • There will not be any ADC on per minute basis on domestic calls. • ADC on International Long Distance traffic shall continue to be on per minute basis but at a reduced rate of Rs 1.60/minute (more than 50% reduction) for Incoming International calls, this in turn will reduce arbitrage and hence grey market. ADC on outgoing international calls have been reduced to Rs.0.80/minute (reduction more than 65%). • All licensees of Unified Access Service, Cellular Mobile Telephone Service, National Long Distance Service and International Long Distance Service shall pay **1.5**% of their AGR as ADC to the BSNL. BSNL will retain ADC chargeable as percentage of its AGR. Unified Access Service Licensee/BSOs retain ADC as percentage of AGR of wireline subscribers and the balance shall be paid to the BSNL. • For estimation of ADC as a percentage of AGR, of access providers, the revenue from the rural subscribers shall be subtracted. • The UASLs/BSOs other than BSNL would retain ADC in terms of percentage of AGR and also on outgoing international calls from their wireline subscribers. • No change in mobile and fixed termination charges from the existing level of Rs.0.30 per minute. • Death of distance acknowledged by moving over to a ceiling carriage of Rs. 0.65/minute irrespective of distance. • No ADC charge on rural revenue of operators to incentivize penetration of telecom services in rural areas. • Strengthening of monitoring mechanism of payment & receipt of ADC by operators.
16 Jan	TRAI issues Consultation Paper on "Tariff Plans with Life Time Validity"

12 Jan	Consultation Paper on Issues pertaining to Next Generation Works (NGN) Issues : **-** • **Awareness and relevance**: Is NGN relevant for India? When should the industry migrate? For which category of stakeholders is NGN relevant? • **Regulatory approaches**: Is there need for regulatory initiatives on NGN? Should there be 'light touch' regulation or are there areas needing more detailed regulation? What regulatory incentives could help boost benefit from NGN and reduce risks? Will a move to NGN in rural areas reduce the gap between urban and rural tele-densities? If yes, how to push NGN to rural India? What interconnection regime needs to be developed in the NGN context? • **Migration issues**: Is there a role for Regulator to ensure smooth migration?
2 Jan	Consultation Paper on Issues relating to Convergence and Competition in Broadcasting and Telecommunications.
2005	
2 Dec	The Register of Interconnect Agreements (Broadcasting and Cable Services) (Second Amendment) Regulation 2005 (12 of 2005). TRAI has decided to amend the existing clause 6 and make consequential amendments in clause 5 of the above regulation so as to enable the Authority to specify a particular procedure in regard to the manner of filing of data or information; to the form or formats of filing; to the number of copies to be filed; and, to such other procedural aspects connected and incidental to the filing of details of interconnect agreements through a simplified process instead of the need to amend the regulations every time whenever a change in procedure is necessitated.
2 Dec	Draft Regulation on Intelligent Network Services in Multi Operator, Multi Network Scenario Regulation 2005 **Salient Features :** • All telecom consumers in the country shall have access to Multi-Operator Multi-Service Intelligent Network (IN) Platform of their choice and no Operator should be allowed to block his consumers from accessing IN platforms of his choice. • It shall be the Access Providers' prerogative to deploy their Intelligent Network (IN).
30 Nov	TRAI issues Direction to Cellular Mobile Service Providers for ensuring Quality of Service that the Quality of Service parameters, including the level of POI congestion, in its network should be strictly within the benchmark laid down by the Authority.
3 Nov	TRAI reiterates its Recommendations pertaining to Local Loop Unbundling and Fiscal Incentives for Broadband.
3 Oct	TRAI provides its recommendations on growth of telecom services in rural India
16 Sept	The Telecommunication Tariff (fortieth Amendment) Order 2005, (7 of 2005) In exercise of the powers conferred upon it under sub-section (2) of the section 11 read with section 11(1)(b)(i) of the Telecom Regulatory Authority of India Act, 1997, the Telecom Regulatory Authority of India.
8 Sept	The Telecommunication Tariff (thirty ninth Amendment) Order 2005, (6 of 2005). re-fixed IPLC tariffs. The new ceiling tariffs for three most commonly used capacities i.e. E-1 (Speed of 2 Mega Bits Per Seconds), DS-3 (Speed of

	45 Mega Bits Per Seconds) and STM-1 (Speed of 155 bits per seconds)
1 July	Regulation on Quality of Service of Basic and Cellular Mobile Telephone Services, 2005 (11 of 2005) modify some parameters, some deleted and also introduce some new parameters.
24 June	Consultation Paper on Issues related to Entry Fee & Annual License Fee for ISP License with Virtual Private network (VPN). This consultation paper presented a scenario in the country as well as international scenario of some other countries and different types of VPN's & background about principles of license fee for various telecom services.
6 June	Consultation paper on Measures to promote competition in International Private Leased Circuits segment in India; This paper presented a scenario in the country as well as international scenario of some other countries, and the technical issues & regulatory concerns arising out of the current situation.