Addressing Rising Data Traffic and Associated Infrastructure Costs in Indian Telecom

- A COAI White Paper

INDEX

EXECUTIVE SUMMARY

There is a world-wide debate raging presently on whether the Large Traffic Generating (LTG) platforms/applications – including Over-the-Top (OTT) service providers such as video streaming and messaging platforms should contribute towards the associated network costs. LTGs put a disproportionate amount of data traffic on the networks and enjoy the benefits of telecom infrastructure built and maintained by operators for gaining profits giving rise to this debate.

These LTGs consume a significant portion of internet bandwidth, leading to increased network costs for operators. However, such platforms currently pay no direct fees for utilizing this infrastructure. This disparity hinders the operators' ability to invest in network upgrades and expansion such as launch of 5G services in India - ultimately impacting service quality for consumers.

The telecom industry's stance on fair-share contribution from LTGs centers on ensuring sustainability and proliferation of the network infrastructure to efficiently deliver the ever-increasing data traffic (chiefly due to LTGs traffic). With the fast evolving trend of digital convergence across sectors, especially with 5G, 5G+ and our aspirations for the future 6G, it is realistic to expect even more bandwidth heavy applications and services to emerge going forward. This means investments in network infrastructure for delivering them would also soar and would be difficult for the telcos to bear alone. Thus, there is an unavoidable need for a fair-share mechanism that ensures equitable contributions from the entities benefitting from the burgeoning app economy.

This paper starts by studying the emerging scenario, the significance of responsible sharing of infrastructure development, maintenance and upgradation costs, and brings out succinctly the need for contribution by different stakeholders. An attempt has been made to use mathematics and statistics, as feasible, to arrive at models to address the issue for the benefit of all concerned.

INTRODUCTION

1. The digital industry is at the center of the debate concerning fair-share contributions from Large Traffic Generating (LTG) platforms to Telecom Service Providers (TSPs). The Indian telecom sector has vehemently advocated for a system where LTGs contribute equitably to the infrastructure costs incurred for the requisite upkeep and advancement of the networks.

2. In the current digital ecosystem, while TSPs charge only the consumers for network access, LTG platforms enjoy a dual revenue advantage, charging both advertisers and consumers in various business models. This disparity between the investments made by TSPs and the causative benefits reaped by LTG platforms is becoming increasingly evident in the rapidly evolving digital landscape.

3. At the same time, opposing views have been articulated by certain parties on various fora, opposing the idea of a contribution by the LTGs.

4. Globally, countries are grappling with similar challenges and finding part solutions. For instance, in South Korea, the tussle between SK Telecom and Netflix over network usage fees and the eventual agreement between them last year, to share the costs, has set a precedent. The European Union is also mulling over a policy framework to ensure that big tech companies contribute to telecom capex budgets. Furthermore, the European Commission's investigation has recognized the significant contribution of large global platforms to network traffic, paving the way for establishing a "fair contribution mechanism" for network usage. Another recent and pivotal development is the introduction of the Lowering Broadband Costs for Consumers Act of 2023 in the U.S. Senate. This legislation establishes the need for various ‘Edge Service providers’ which generate disproportionately large traffic, i.e., LTGs, to contribute towards infrastructure costs.

5. The above actions, in multiple territories across the world, for the LTGs to contribute to network costs, is similar to the position being taken by the Indian Telecom sector.

6. A recommendation by some obvious quarters that TSPs should raise consumer tariffs to recover the network expenses and ensure the sector's sustainability, is laughable. However, it brings out the acceptance even by this quarter of the huge unviable expenses imposed on TSPs to set up the required networks.

7. **The approach of TSPs' operating in India is clear, unambiguous and consumer-centric: seek contribution through Business-to-Business (B2B) means without burdening the end consumer with additional costs.** This approach

is aligned to the Government of India's vision of providing affordable and quality digital connectivity to all citizens.

8. While the focus is on ensuring that LTGs contribute their fair share, it's equally crucial to protect the interests of **startups and MSMEs**. These emerging platforms, although smaller in scale, play a pivotal role in fostering innovation and diversity in the digital space. However, **their contribution to the overall traffic compared to LTGs is quite small, and hence, need not come within the ambit of fair share**. The modelling which follows in subsequent paragraphs takes into account this assertion fully.

9. Focusing on Large Traffic Generators (LTGs) would ensure that only those platforms which place a higher demand on the network infrastructure contribute proportionately to its upkeep and expansion. **Such a system not only promotes fairness, but also encourages LTG platforms to optimize their data usage, leading to a more efficient and sustainable digital ecosystem. This would also protect the rise of innovation and entrepreneurship through smaller players while ensuring that better networks and more expansive digital connectivity can be made available to all for nation building.**

10. Keeping in mind the above discussions, an attempt has been made to formulate mathematics and statistics based models explaining the issue and its possible solutions. This is outlined in the succeeding sections.

ANALYSIS OF THE ISSUE

11. This section of the paper analyses the infrastructure spends of the industry vis-à-vis the growth in data traffic over an extended timeframe starting from 2014 and going up to 2023 and beyond, bringing out visible trends. These have been thereafter used to arrive at possible models for the solution.

Infrastructure Costs Trends by period (Capex increase for Indian Telecom Sector)

12. Capex for Telecom Service Providers (TSPs) have two major components - Spectrum Cost and Infrastructure Cost.

13. With regard to infrastructure cost, three key periods define the trends in Infrastructure spends (capex) made by the Indian TSPs as evident in the graphs below:

a. **Pre-2014** - This is the pre-OTT era, when rich applications were not in use, and general internet use along with voice and messaging services were provided by the TSPs. The graph below captures the declining trend for capex requirements of the TSPs, owing to steady network capacity requirements.

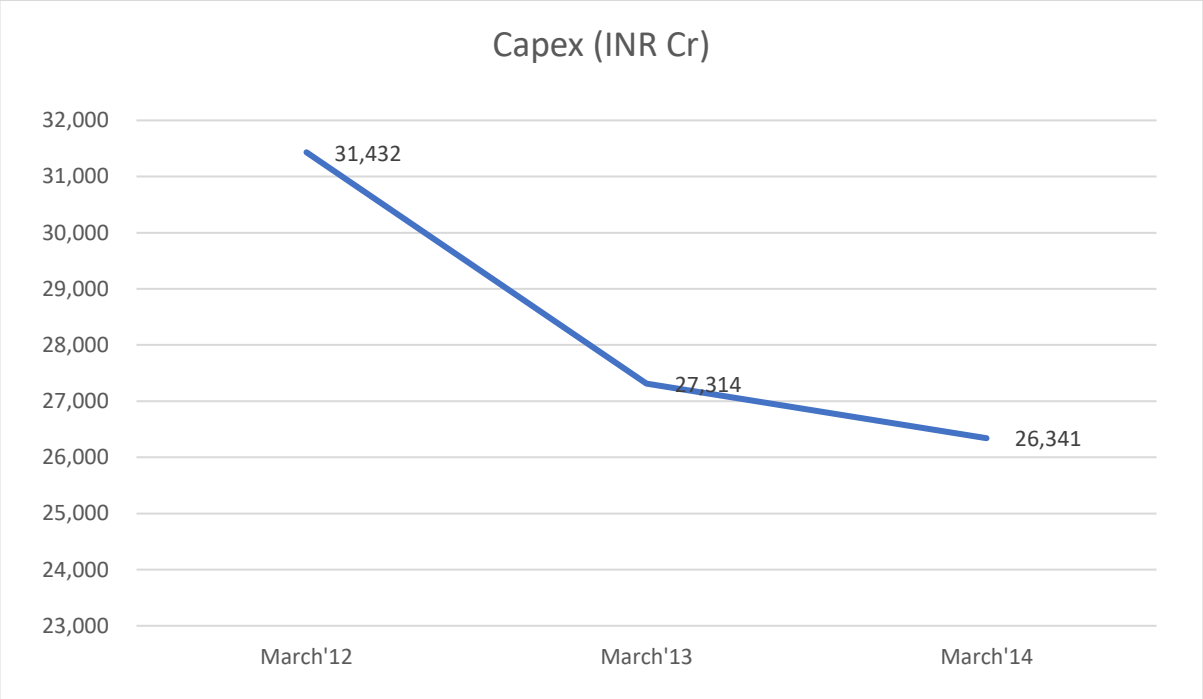

Figure 1: Infrastructure spends during 2012-2014; Source: COAI Analysis

b. **2015-2018** – This period represented the increase in data consumption owing to introduction of 4G services, increased affordability of data prices and the advent of OTT applications. The graph below shows the rise in capex for the telcos as more investments became necessary to cater to the increased data traffic.

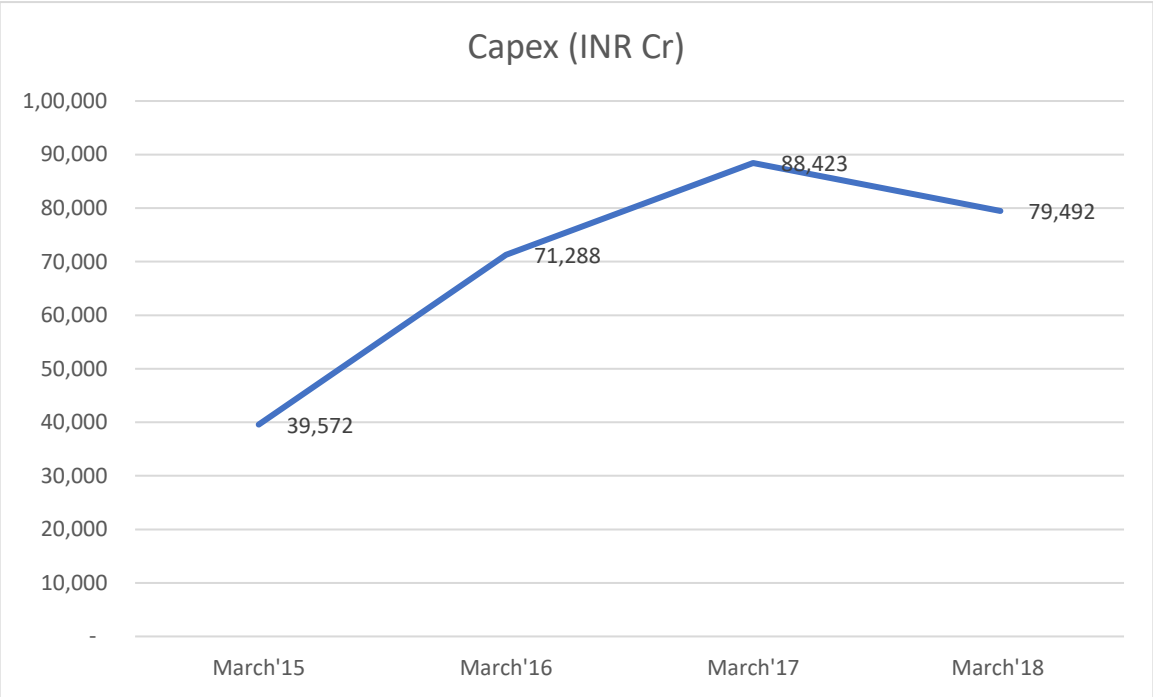

Figure 2: Infrastructure spends during 2015-2018; Source: COAI Analysis

c. **2019-2023 (present)** –

i. The latest period, especially from the outbreak of the pandemic depicts the spurt in capex requirements, and its continuous upward trajectory thereafter.

ii. The noticeable drop between FY 2020 and 2021 in infrastructure capex, can be attributed to a combination of various factors including, but not restricted to, AGR judgement and difficulty in physically rolling out of networks due to the lockdown period when mobility was restricted, and the prime focus was on continuity of services to keep the economy running using network resilience and reconfigured built in capacities.

iii. Post pandemic in 2021 the restrictions eased, and the network rollouts started in right earnest to match the already continuously rising data traffic. This also factored in part payments for spectrum acquisition through auctions.

iv. The study of data traffic in subsequent paragraphs also indicates the same conclusions arrived at above.

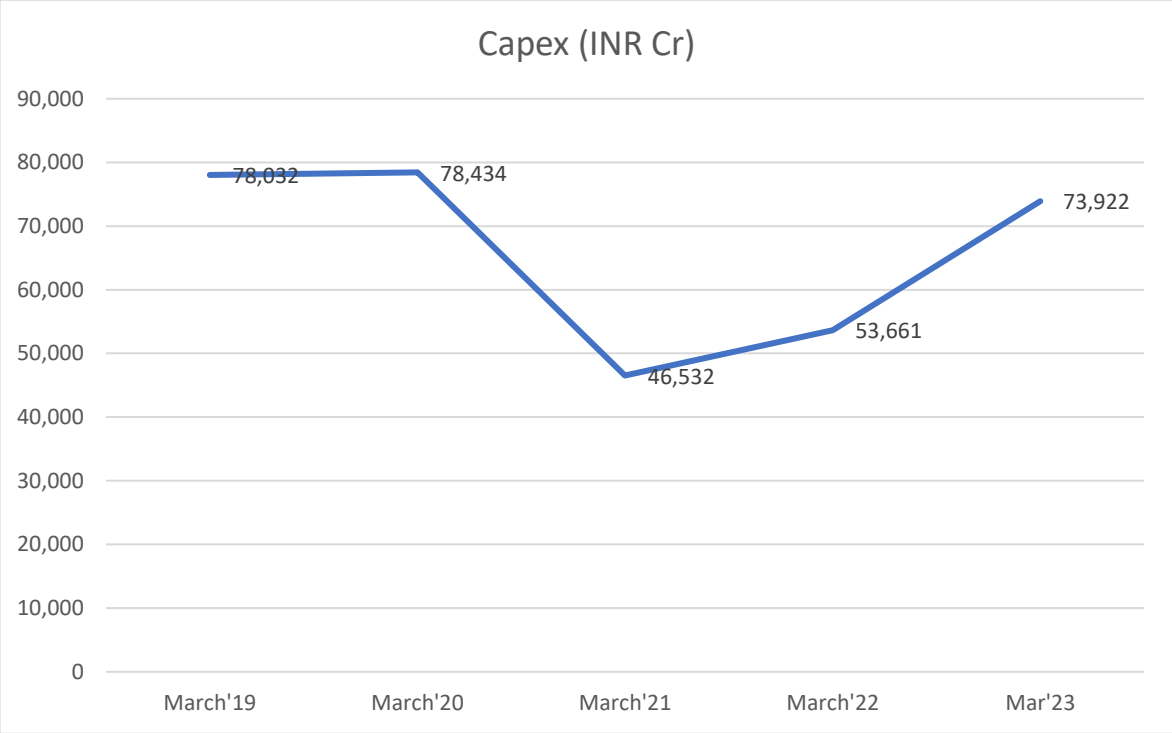

Figure 3: Infrastructure spends during 2019-2023; Source: COAI Analysis

Data Traffic vis-à-vis Infrastructure spends

14. The infrastructure capex is determined by a complex relationship between GR and RoI which has multiple variables, which may be standalone or may have inter-play with each other. These variables may be near constant for a short period of time but for longer periods, say 6/7 years, many variables change unpredictably. For example, market conditions have undergone a change and there have been major changes in the regulatory and policy interventions, including the AGR verdict, which has impacted the value of these variables. Therefore, without a method to predict and normalize these multiple fast-changing variables, it will be difficult to calculate how infrastructure cost is impacted by these factors over a longer period of time. Hence, other conducive logical methods of arriving at the desired results will be studied in this paper.

15. Since data carriage capacity is directly proportional to the infrastructure created, hence, in the analysis that follows, it will be examined how infrastructure costs get affected by measuring the data required to be carried on the infrastructure provided, thus, giving a direct view of how the infrastructure cost is affected. This approach is henceforth followed.

Data Usage & Analysis

16. The trend in per user data consumption is shown in figure 4 below.

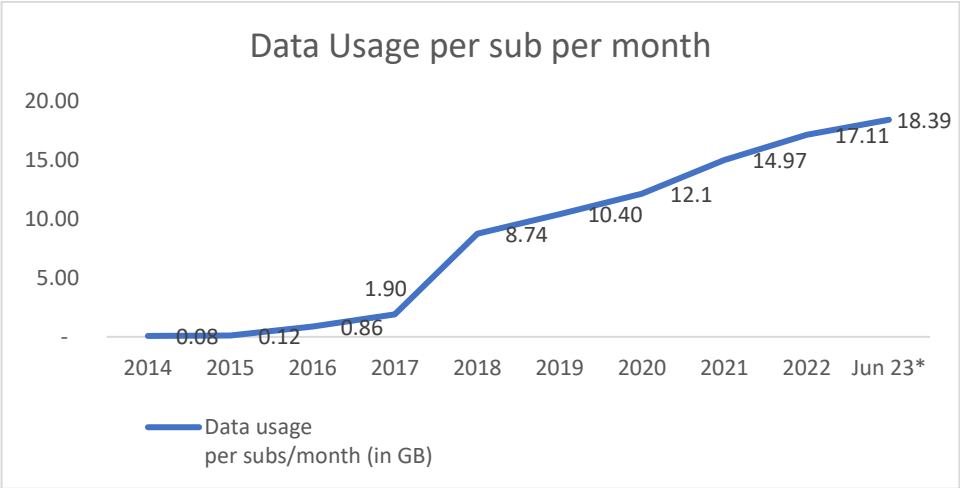

Figure 4; Source: Graphs plotted from TRAI data of relevant period

17. Figure 4 can be broken up into three parts for purposes of analysis:

a. **2014 to end-2016**: Routine growth of data consumption, subscriber acquisition and hence, infrastructure cost. This pertains to whatever voice and data services are being offered to subscribers within the license conditions by TSPs on TSP networks.

b. **End-2016 to mid-2018:** Abnormal spurt in data consumption pattern of subscribers which stabilized in mid-2018. This is also the period when LTGs started making offerings to subscribers in greater numbers.

c. **Mid-2018 to June 2023:** Steady rate of growth of data consumption for all data carried on TSP networks - including TSPs and LTGs and others.

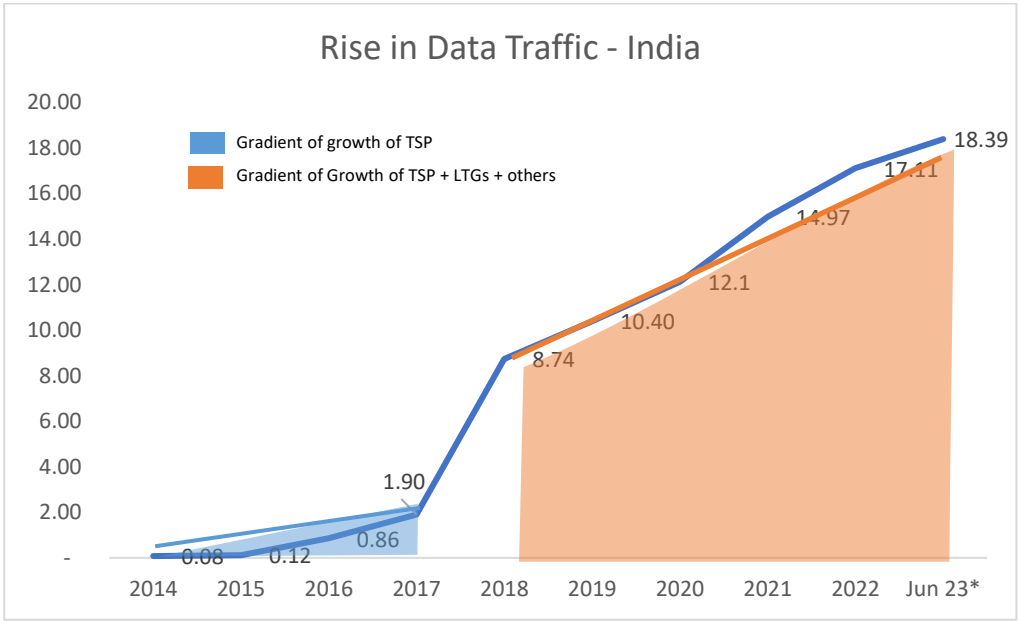

Figure 5; Source: TRAI data & COAI analysis

18. Ignoring the aberration of the period end-2016 to mid-2018 above, it can be observed that there are two slopes – 2 gradients of growth in data patterns which are evident for the periods 2014 to end-2016 and mid-2018 to June 2023, as shown in blue colour and orange colour in figure 5. The gradients of both are different, i.e., the rate of growth and hence, cost of infrastructure provisioning for the relevant periods are different.

19. Refer to figure 5. It can be seen that for the period shown in the period mid-2018 to June 2023 above, the expenditure as shown by the orange coloured area is much steeper and higher than what was in the period end-2016 to mid-2018, as shown in the blue coloured area.

20. A similar exercise with the actual data usage from June 2018 to June 2023 shows a data consumption which has risen to 18 GB/sub/month. This dramatic change can be attributed to the data consumed due to offerings made by LTGs and others. **Figure 5** illustrates the same.

21. For ease of understanding and to compare the growth of both segments i.e., (2014-2016 and 2018-2023 periods) the growth gradients need to be brought to a common point (**Z in the figure**), ignoring the meteoric rise in the period end-2016 to 2018. This is shown in **figure 6**.

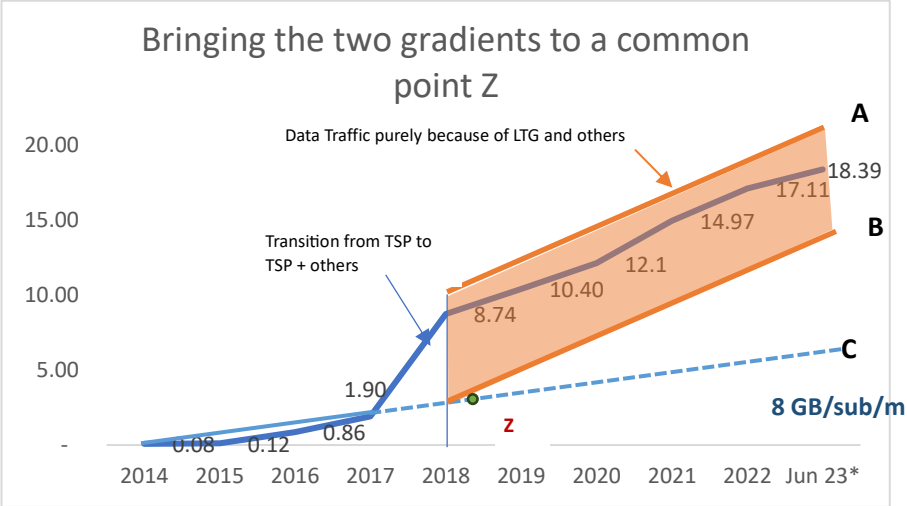

Figure 6; Source: TRAI data & COAI analysis

22. The gradient of growth for TSP traffic alone for the period of 2014-2017 has been extended to June 2023 in the graph in dotted lines. The intersection of this extension with the Y axis shows the likely consumption as 8 GB/sub/month (approx.).

23. Figure 6 shows a broadening funnel being created, with the lower line representing the baseline TSP traffic[1] and the upper gradient line with a steeper slope shows combined data consumption by subscribers for TSPs as well as LTGs and others, for the same growth of subscribers. It can be seen that the funnel aperture (BC in figure 6) is increasing in width with every passing spot on the time axis i.e., X axis.

24. It is fair to assume that this funnel will continue to increase in future too, as per the trends, and will entail higher quality of infrastructure to be provided by TSPs.

Inference

25. The infrastructure required for only baseline TSP traffic, remains to be much lower compared to what is required to service aggregated traffic generators (subscribers and LTGs), *as shown in figure 7*. Thus, the additional cost of rollout of infrastructure to carry this aggregated data, causes a burden on infrastructure provision, but without any ROI. This additional traffic is mainly generated by LTGs who are not contributing for this increased quality and scope of infrastructure.

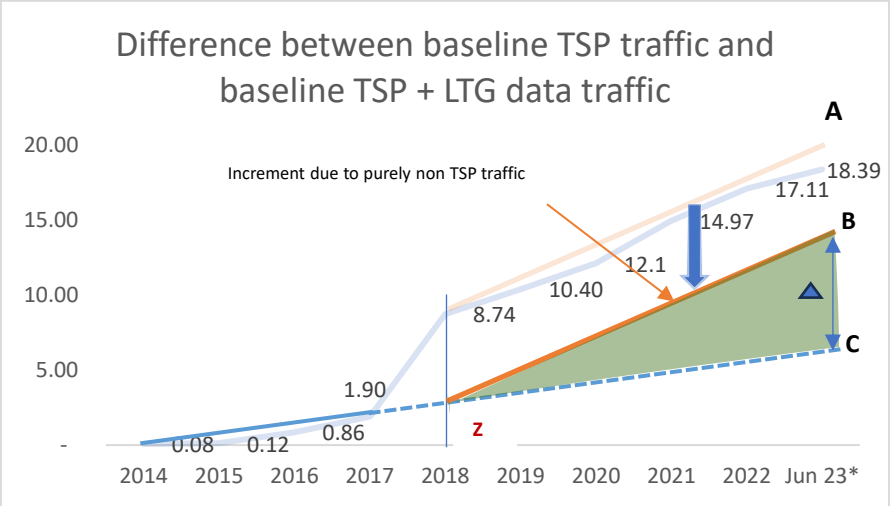

Figure 7; Source: TRAI data & COAI analysis

26. The increasing differential of infrastructure requirements for (i) only baseline TSP traffic and (ii) for entire traffic including LTGs is shown as shaded funnel (green) in figure 7, ignoring the aberration period of steep rise from end-2016 to mid-2018.

a. It establishes that the data traffic, which had a much lower growth rate earlier to the advent of OTT and other rich applications/platforms, is now growing significantly faster. The costs for providing the underlying infrastructure for these services, continues to be borne by the TSPs.
b. Further, if we see the period 2019-2023 (present), the traffic is increasing at an unprecedented rate, thus, necessitating increased network

[1] baseline TSP traffic: Based on Voice and Data services provided by TSPs only – excludes LTG/other services.

investments if this increased traffic has to be carried with adequate quality and resilience.

c. There is a broadening gap between the infrastructure costs to cater for only the services provided by the TSPs in comparison to the mammoth increase in the costs attributable to the LTGs.
d. This additional cost, being an increase due to LTG traffic, needs to be contributed by LTGs. However, it is presently borne entirely by the TSPs alone, compromising their business viability.

POTENTIAL MODELS TO ADDRESS THE INFRASTRUCTURE COST REQUIREMENTS

27. Accepting the reality of coexistence of TSP traffic and LTG traffic, there is a need to offset the heavy burden on TSPs primarily because of the burden of providing infrastructure for the extraneous non-revenue generating data of LTGs (for TSPs), so as to be able to provide high quality networks for both these users for overall good of the nation and for speedier implementation of Digital India aims of the Government of India. The models which can meet this objective fully/partly are enumerated below.

28. Referring to figure 7 above, the aim is to achieve congruence of the gradient of the actual current consumption pattern given in orange to as near the gradient of blue, which is the minimum derived for base line TSP traffic. The emerging models are given below:

a. **Model 1 (refer figure 8):** Raise the gradient of baseline TSP traffic shown by dotted blue gradient, to converge with the orange gradient. This would mean a higher infrastructure costs to meet the higher usage of data which would translate into increased tariffs for all subscribers, including those who do not consume LTG traffic. This is not recommended, as it will be unfair to TSP only subscribers.

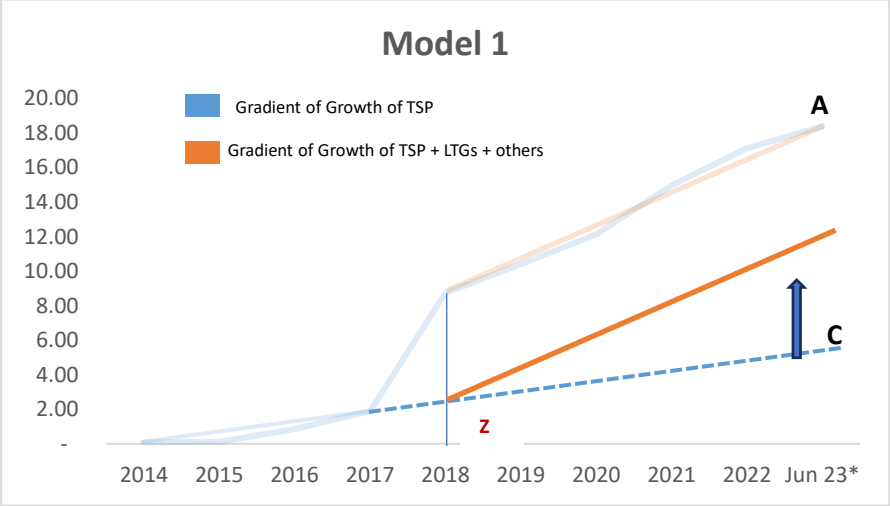

Figure 8; Source: TRAI data & COAI analysis

b. **Model 2 (refer figure 9):** Bringing down the higher gradient (orange) parallel to the blue dotted gradient line, thus ensuring sustainable incremental cost for infrastructure deployment to TSPs. This will be at the cost of substantially reducing the quality and standard of LTG or other non-TSP offerings. This defeats the purpose of providing quality digital services to every citizen and hence, is not recommended.

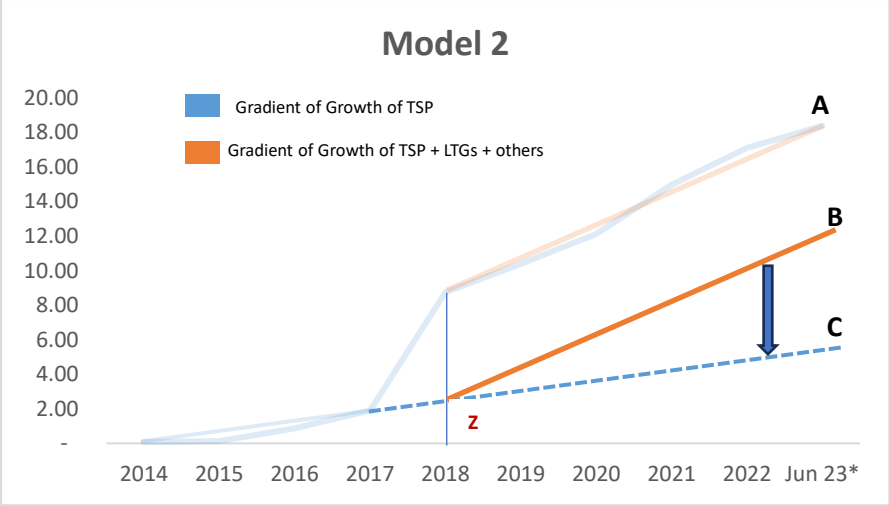

Figure 9; Source: TRAI data & COAI analysis

c. **<u>Model 3 (refer figure 10)</u>:** Let the blue gradient subscribers and orange gradient subscribers run as it is, but with differentiated tariffs. The differentiation starts from consumption beyond the intersection with the blue gradient (pt. Z in the figure), which means lower data tariffs for base line TSP subscribers, and a higher subscription tariff for others as shown in orange colour in the graph. This goes against the license conditions and principles of Net Neutrality. Hence, this is not recommended.

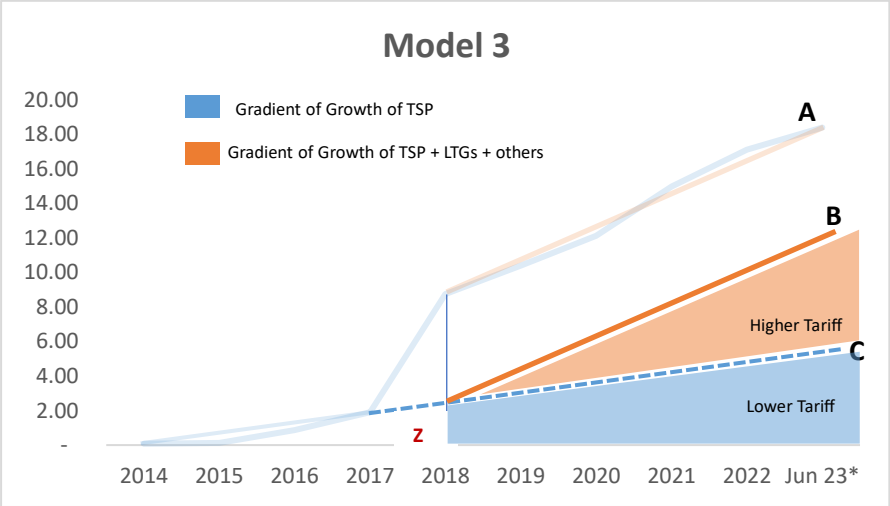

Figure 10; Source: TRAI data & COAI analysis

d. **<u>Model 4 (refer figure 11)</u>:** In this option, increase in infrastructure spends caused by the delta between the blue and the orange gradients (A – B) needs to be contributed by the entities causing the difference in the gradients i.e., LTGs and others. This contribution should be based on the increasing width of the gap between the blue and orange gradients. This is a workable option.

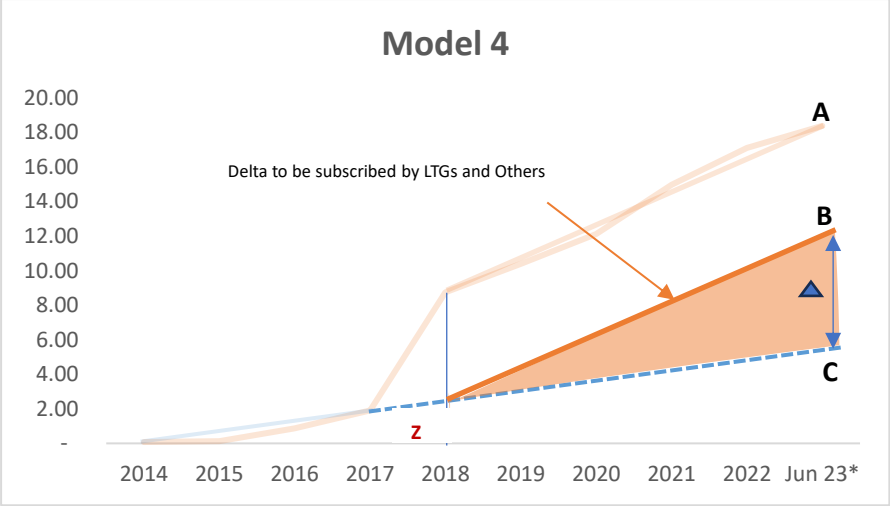

Figure 11; Source: TRAI data & COAI analysis

e. **<u>Model 5 (refer figure 12)</u>:** A modification of model 4 can be to start measuring the difference between the 2 lines from say 2019, when the traffic differential was minimal or fix a parallel spot with incremental differential of say n% (hypothetical). This modification will accommodate Startups, MSMEs and other smaller players, but will encompass only the 4-5 LTGs contributing to this widening funnel. This is a feasible option and addresses all concerns of various parties – i.e., net neutrality, double dipping and others. Hence, **<u>this appears to be the most preferred option</u>**.

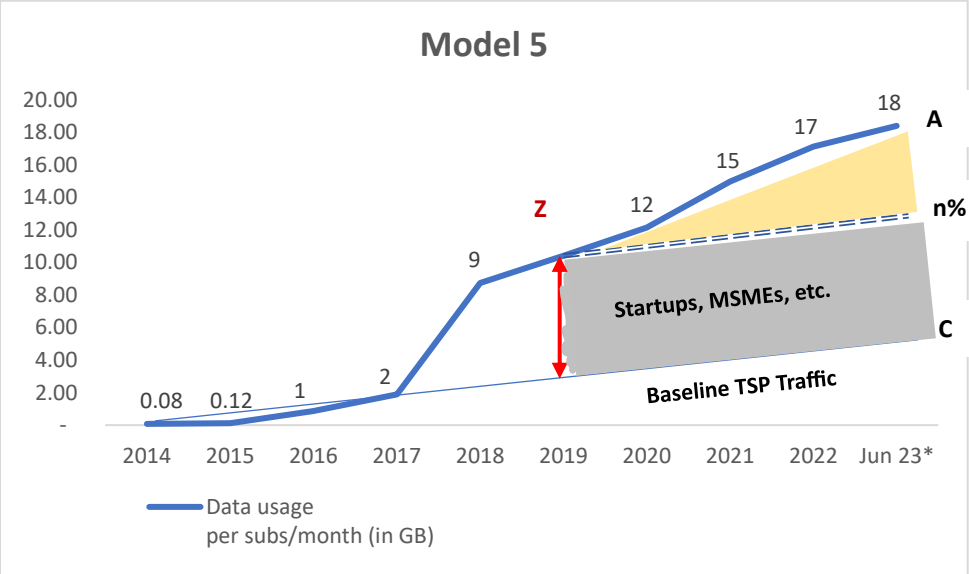

Figure 12; Source: TRAI data & COAI analysis

CONCLUSION

29. Putting the entire burden on the TSPs is neither sustainable, nor prudent. On analysing the above models, model 5 emerges best suited towards addressing this continuously rising infrastructure cost driven by accelerated data usage due to LTG traffic. **The best solution is for an equitable share of these costs to be borne by the 4-5 LTGs responsible for the disproportionate traffic growth.**

30. If we are to truly realise the 'Digital India' vision, collaborative efforts and responsible contributions need to be made by all the stakeholders involved, to ensure sustainability and advancement of the continued incredible journey of India's technological growth and prowess.

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