



Indian Institute Of Management Indore

Indian Telecom Policy – Network Resources Usage

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6-10-2021

Table of Contents

Abstract.....	6
Chapter 1.....	7
Introduction	7
Chapter 2.....	11
Indian Telecom Policy: Usage of Network Resources	11
1. Overview	11
2. Present Indian Telecom scenario.....	13
Market Share:	15
TRAI KPI guideline and compliance:.....	19
Consolidation:	26
3. Network Traffic characteristic.....	27
4. Design of network.....	29
5. Pricing Approach	30
Price Discrimination	30
Peak Load and Peak load pricing.....	30
6. Literature review.....	32
7. Research objectives	35
8. Hypotheses	38
9. Methodology.....	38
10. Sources of Data Collection	39
11. Result	40
12. Conclusion.....	57
Chapter 3.....	58
Telecom Policy causing premature death of a promising telecom company.....	58
Introduction	58
Back-Ground - Aircel & Reliance JIO	59
Aircel	59
Reliance JIO.....	61
PART- 1.....	62
Financial health of Aircel during 2012 – 2017	62

LIQUIDITY & SOLVENCY RATIOS	72
PROFITABILITY RATIOS	84
Expenditure Analysis vis-à-vis Industry Average.....	89
Conclusion:.....	91
Part-2.....	91
RJIO Entry to Indian Telecom Industry -	91
Customer Acquisition.....	93
Round 1: Test trials	93
Round 2 : Welcome Offer	95
Round 3: Happy New Year offer	96
Round 4: Summer Surprise	97
After effects	98
Impact on Aircel while JIO entry	99
Chapter 4.....	106
Conclusion.....	106
Bibliography	108

Tables

Table 1: Subscriber base, growth, and market share 2016	15
Table 2: Subscriber base, growth, and market share 2017	16
Table 3: Subscriber base of the operators and market share in the year 2018 & 2019	16
Table 4 : Market concentration HH Index.....	17
Table 5: Quality of service summary 2G (Second Generation) Wireless Services by TRAI-2017.....	21
Table 6: Quality of Service summary 3G (Third Generation) Wireless services by TRAI-2017	23
Table 7: (Quality of service) summary of Wireless Services released by TRAI-2019.	24
Table 8: Mumbai- Aircel Traffic (Erlangs) Day wise Analysis – utilization and M Curve.....	42
Table 9: Mumbai – Hourly Traffic (Erlangs) utilization - M Curve.....	43
Table 10: Punjab Traffic (Erlangs) Day Wise Analysis – utilization and M Curve.....	45
Table 11: Punjab – Hourly Traffic (Erlangs) utilization - M Curve	46
Table 12: Mumbai Aircel (Black out day) Traffic (Erlangs) Analysis – utilization and M Curve	47
Table 13: Aircel PAN India traffic utilization Business/Network Busy Hours.....	49
Table 14: Vodafone – AP traffic utilization Business Busy Hours	51
Table 15: Airtel- Kolkata Traffic utilization	51
Table 16: Traffic Sensitivity (Talk Time in Minutes)	53
Table 17: Shifting traffic pre to post change.....	55
Table 18: Changes in distribution of Total Traffic after introduction of Free TT	55
Table 37: Interest as percentage of Revenue Aircel	78
Table 40: Fixed Asset Turnover Ratio Aircel	82
Table 43 : ROCE Aircel.....	84

Figures

Figure 1: Market share of Indian operators (in %) as on 30th Nov 2016.....	15
Figure 2: Typical “M” Curve	28
Figure 3: Pricing Strategies.....	31
Figure 4: Telecom Regulatory Governing Index (TRGI) plot for countries part of ITU (International Telecom Union).....	34
Figure 5: “M Curve” Mumbai	44
Figure 6: “M Curve” Punjab	47
Figure 7: “M Curve” Black-out day.....	48
Figure 8: Average EBITDA- Industry	65
Figure 9: Network Opex Vs AOP (Annual Operating Plan – Target).....	66
Figure 10:EBIT Saving Vs Target	67
Figure 11: Item Wise Break-up of EBIT Saving Against Target-2017.....	67
Figure 12: Per site cost in (INR’000).....	68
Figure 13 : Trend Current Ratio Aircel	72

Figure 14: Trend Quick Ratio Aircel	73
Figure 15: Trend Long Term Debt Equity Ratio Aircel.....	74
Figure 16: Trend Debt Equity Ratio.....	76
Figure 17: Trend Interest payment Aircel	77
Figure 18: Interest Payment Industry	78
Figure 19: Trend Interest payment as % of revenue Aircel	78
Figure 20: Average Industry Interest payment as % Revenue	79
Figure 21: Trend Interest Coverage ratio Aircel.....	80
Figure 22: Industry Average Interest Coverage Ratio	80
Figure 23 : Trend Inventory Turnover Ratio Aircel	81
Figure 24: Trend Fixed Asset Turnover Ratio Aircel.....	82
Figure 25: Trend Asset Turnover Ratio Aircel	83
Figure 26: Trend ROCE Aircel	84
Figure 27: Industry Average ROCE	85
Figure 28 : Trend Operating Profit Margin Aircel	86
Figure 29: Trend Gross Profit Ratio Aircel.....	87
Figure 30: Trend Net Profit Margin Aircel.....	88
Figure 31 : % Percentage (%)Wise distribution Aircel	89
Figure 32 : Year Wise Distribution Expenses	90
Figure 33 : Industry Average of Expenditure distribution – 7 Year’s Average.....	90

Abstract

Industry regulators use pricing as a tool to bring in efficiency, optimal use of the available capacity and deployed resources. Specifically, to those service industries where there is capacity constraint and storage is not possible or it involves very high cost like the power sector. The telecom industry also falls in this category. In India, in the absence of this approach the Network capacity deployed to handle the busy hour traffic (peak traffic intensity) is underutilized in non-busy hours. It is perishable inventory, and once the capacity of Network is lost, cannot be recovered, neither can it be stored for future. Pricing as a tool in telecom, in India, was mainly used by the regulator, to improve competitiveness (control monopoly power) of the industry and used for network growth. The price discrimination and revenue management by the Indian Telecom operators were not much visible, with the objective of Network utilization. Pricing as a tool for improving Network utilization has rarely been explored so far. In fact, the TRAI, the Indian regulator overlooked Network Utilization, assuming a competitive market will automatically take care of Network efficiency. The operators were able to pass on the inefficiency to the users and not took many initiatives to overcome this deficiency. It is only the regulator who can force them for greater network traffic harmonization. Operators are benefitted by requiring less network resources and users are benefitted by having to share less of its proportionate Capital Expenditure and Operational expenditure cost in terms of reduced tariff and increased welfare. The discussion is focused on these aspects and highlights the shortcoming of the regulator's policy to improve efficiency.

We have also taken up a case study to showcase the death of a promising telecom company due to an immature telecom policy. The immature telecom policy squandered off the effort and progress made during the last two decades to bring the telecom industry into a competitive market and again brought back to oligopoly.

Key Words: Network usage, Peak Non- peak Hour's traffic, Telecom Traffic sensitivity to tariff, Capacity of Telecom Network

Chapter 4

Conclusion

The study describes pricing as a tool for the regulator to bring in efficiency by optimizing the deployment of Telecom Network resources. In the absence of this approach, the Network capacity deployed to handle the busy hour traffic (peak traffic intensity) is underutilized in non-busy hours. The pricing discrimination and revenue management were used by the operators with the sole objective of profit maximization. Pricing as a tool for improving Network utilization was not visible. In fact, the TRAI, the Indian regulator assumed competitive market forces⁶⁴ will automatically take care of Network efficiency. The operators were able to pass on the inefficiency to the users and not took much initiative to overcome this inefficiency and only regulator can force them to for greater network traffic harmonization. Operators are benefitted by requiring less network resources and users are benefitted by having to share less of its proportionate Capital Expenditure and Operational expenditure cost in terms of reduced tariff and increased welfare. The discussion is focussed on these aspects and highlighted shortcoming of the regulator's policy to bring in efficiency.

We have also taken up a case study to show case the death of a promising telecom company due to immature telecom policy. The immature telecom policy squandered off the effort and progress made during last two decades to bring the telecom industry into a competitive market and again brought back to oligopoly⁶⁵.

In the Chapter 2 we have observed that the peak traffic is significantly different from the non - peak traffic. Then we have also noticed that traffic is sensitive to price, by charging peak price some of the traffic can be diverted to non- peak slots or non-busy hours. We have observed that the installed capacity of the operators is under-utilized. By diverting peak traffic requirement of network capacity can be reduced for serving similar group of customers and there is better utilization of network in non- peak hour. Without this, underutilized network cost⁶⁶ is passed on to the customers. [But still telecom tariff was declining in India]. We have seen that there are many KPIs (Key parameter Index) related to QOS (quality of service) laid down by the regulator TRAI, which an operator needs to comply with. There is no

⁶⁴ Based on the regulator's (TRAI) data HHI has been calculated and the HHI has increased to 2698 in 2018 – 19 showing highly concentrated market.

⁶⁵ Pls refer the HH index calculation in this regard.

⁶⁶Underutilized network incurs more cost in terms of Capex and Opex.

KPI by the regulator for the utilization of the capacity installed by the operators. The regulator thought in a competitive market forces will reduce the utilization cost. Therefore, it was concluded that the regulator TRAI needs to revisit its tariff policy of forbearance and come out with KPIs related with Network Utilization.

In the Chapter 3 we have seen new entrant RJIO benefitted from the existing policy of TRAI (starting from acquiring spectrum not through direct auction, but taking over a company shortly after, who has won the PAN India 4-G, spectrum paying five times than its net worth). Subsequently, getting a license to provide voice call over 4-G spectrum (which was not envisioned before by TRAI) by paying a relatively small amount of Rs 1685 crores (effective Rs.83 crores per MHz against Rs 1116 crores paid by others). [In some places it is Rs., but in other places it is INR. It should be standardized]. It also acquired significant customer base even before launching commercial service in the disguise of network testing and subsequently, by providing free services in promotional offers in several stretches over nine-month period. The predatory pricing (providing service below its actual cost⁶⁷as alleged by other operators, adopted by RJIO, was overruled by TRAI. Then came downward revision of IUC (Interconnect Usage) charges, advantage also went in favour of RJIO. In case of Aircel, we have seen it was constantly trying to adjust itself initially in terms of cost saving, opex saving, EBIT saving initiatives, shutting down non profitable circles, selling the unused spectrum to Bharti Airtel and many other initiatives to reduce cost of operation. Then it also tried to merge with RCom to survive and pay off its debt to some extent. All these initiatives failed. Aircel subsequently tried to restructure its debt, but unfortunately new RBI guidelines related to NPA (non-performing Assets which just came after Bank of India fraud case in 2018) stopped implementation, although lenders were in favour of the proposal. It appeared Aircel explored all the options available to it for survival. It was observed that TRAI was having some kind of policy paralysis at the time of entry of R-Jio, Finally Aircel filed for bankruptcy in February 2018.

⁶⁷RJIO provided voice service to all its customers below IUC(interconnect usage charges) Change in definition of predatory pricing to 'selling below average variable cost' from a test of interconnect usage charge-(IUC) compliance (voice pricing had to be above IUC rates in the earlier test of predation)

Bibliography

- Bhatia, J., & Rao, A. (2016). *Reliance Jio: Predatory Pricing or Predatory Behaviour?*
- Cha, a. K., Jun, b. D., Wilson, c. A., & Park, Y. S. (2008). Managing and modeling the price reduction effect in mobile telecommunications traffic. *Telecommunications Policy*.
- Cheon, K. e. (2008). Managing and Modelling the price reduction effect in mobile telecommunications traffic.
- Christoph et. al. (2014). Link between termination rates and retail prices in Namibia, Kenya and South Africa.
- Christoph Stork, A. n. (2014). Link between termination rates and retail prices in Namibia,. *Telecommunications Policy*.
- Chun, L. a., & Jayakar, K. (2012). *Telecommunication Policy*.
- Cooper, R. N. (2006). *“How Integrated Are Chinese and Indian Labor into the World Economy?”*. Washington, DC:: World Bank.
- Craver. (1976).
- Cross, 1., & Smith, L. D. (1985). American Airlines.
- Das, N. (2000). Technology, efficiency and sustainability of competition in the Indian telecommunications sector. *Information Economics and Policy 12 (2000) 133–154*.
- DBR.No.BP.BC.101/21.04.048/2017-18, R. B.-1. (2018). *Resolution of Stressed Assets – Revised Framework* . Mumbai.
- DOT. (2008).
- Fiebig, B. &. (1988).
- Fink et al. (2001). *Liberalizing Basic Telecommunications*.
- Foster, W., Wolcott, P., McHenry, W., & Larry. (2003). *The Internet in India and China*.
- Garbacz, C., & Thompson, H. G. (2007). Demand for telecommunication services in developing countries. *Telecommunications Policy*.
- India, T. R. (2017). *Indian Telecom Service Performance Indicator(April - June 2017)*. New Delhi.

- Jain, M. &. (1999).
- Jain, P., & Sridhar, V. (2003). Analysis of Competition and Market Structure of Basic Telecommunication Services in India. *COMMUNICATIONS & STRATEGIES*.
- Lago. (1970).
- Leonard, W., & Koutroumpis, P. (2011). Benchmarkingtelecomsregulation–TheTelecommunications. *Telecom policy*.
- Michalakelis, C., Dede, G., Varoutas, D., & Sphicopoulos, T. (2010). Estimating diffusion and price elasticity with application to telecommunications. *Netnomics*.
- Naldi, M., & Pacifici, A. (2010). Optimal sequence of free traffic offers in mixed fee-consumption pricing packages. *Decision Support system*.
- Neckowitz, C. &. (1980).
- Neckowitz, C. &. (1980).
- OECD. (2013). *OECD Communications outlook 2013*. online: OECD Publishing.
- OECD, S. G. (2012). *OECD Review of Telecommunication Policy and Regulation in Mexico*. Paris: OECD publishing.
- Rea, &. L. (1978).
- Saha, B. (2004). State Support for Industrial R and D in Developing Economies: Telecom Equipment Industry in India and China. *Economic and political weekly* .
- Sinha, S. (2000). Price Regulation of Telecommunication Services:TRAI's First Tariff Order. *Vikalp*.
- Sinha, S. (2000). Price Regulation of Telecommunication Services:TRAI's First Tariff Order. 2.
- Sridhar & Sridhar. (2006). telecommunications and Growth Causal Model, Quantitative and Qualitative Evidence. *Economic and Politcal weekly*, 6.
- Srikumar et.al. (2001). *Analysis of competition and market structure of basic telecommunication*.
- Steiner, P. O. (1957). Peak load and Efficient Pricing. *The Quarterly Journal of Economics*.
- The Telecom Revolution in India- Technology Regulation and Policy. (2012). In V. Sridhar. Oxford University Press.
- TRAI. (2012). *Telecom Sector in India : A decadal profile*. New Delhi: TRAI.
- TRAI. (2016). *The Indian Telecom service performance sector 2016*.

- TRAI. (2017). *Indian Telecom Service Performance Indicator (April - June 2017)*.
- TRAI. (2017). *Indian Telecom Service Performance indicators April - June 2017*.
- TRAI. (2017). *Regulatory Principles of Tariff Assessment- . Consultation Paper*.
- TRAI. (2020). *TRAI press release No.17/2020*. New Delhi: TRAI.
- TRAI. (n.d.). [https://main.trai.gov.in/sites/default/files/rm%20\(1\).pdf](https://main.trai.gov.in/sites/default/files/rm%20(1).pdf).
- TRAI. (n.d.). *The Indian Telecom Services Performance Indicators Jan - March 2019*. New Delhi.
- Triantis, S. &. (1982).
- Vannucci, D. E., Kennedy, I. G., & Barker, M. A. (2003). Impact of tariff on dial-up Internet traffic:Modelling the subscriber response as a dynamic System. *TRANSACTIONS OF THE SOUTH AFRICAN INSTITUTE OF ELECTRICAL ENGINEERS*.
- William McHenry, S. E. (1999). *The Diffusion of the Internet in the Republic of India: An Update (December, 1999)*. Larry press.
- Withman. (2001).
- Y. d'Halluin, P. F. (n.d.). *Managing Capacity For Telecommunications Networks Under Uncertainty*. IEEE.
- Yatrakis. (1972).

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