International Journal of Information Technology and Management
Vol. 17, Issue No. 3, November-2022, ISSN 2249-4510

DOI: https://doi.org/10.29070/m5kdw531

Impact of Various Telecom Policies on Tele-Density Growth

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Abstract: Seventy percent of India's rural population works in agriculture, although the sector only accounts for 23 percent of the country's gross domestic product (GDP). Factors like as unpredictable weather, inefficient markets, and investment-related obstacles pose significant risks to the industry. The expansion of cellular networks into rural India has the potential to significantly boost agricultural output. There have been substantial positive welfare impacts from mobile telephony, as shown by the empirical research. Technological advancements, such as the ever-increasing efficiency and decreasing prices of telecom equipment, and regulatory reform, which has enabled enterprises to compete more freely in the telecom market, are the primary forces behind the proliferation of mobile telecommunications (Gruber). Given that 70% of India's population resides 60 percent of the population is under the age of 18 in rural regions of 35, it is crucial to comprehend the immense potential associated with the younger generation's propensity to utilize the internet and the correlation between the expansion of education and its proliferation, as highlighted in the 2011 ICT report.

Keywords: Telecom, Policies, Growth, Rural and Policy

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INTRODUCTION

The telecoms business has a few of very notable years in the past. There were a number of major events that year that altered the course of the business, ushering in a period of unprecedented expansion in tele density and subscriber additions while also marking a persistent downward trend in Average Revenue Per User. In spite of an increase in subscribers, the first and most consequential event of the last several years was the start of a fierce tariff war, which led to dropping ARPUs. In a last-ditch effort to hold on to their market share, all of the service providers followed Tata Docomo's lead and implemented per-second pricing plans, setting off the tariff war.

This was exacerbated when new competitors entered the market and offered competitive pricing plans to entice users. As a consequence, the competition among operators became even more intense. Consumers reaped the benefits in the form of a record-breaking rise in the total number of users, but operators across the board felt the pinch of falling ARPUs. This was especially true for new entrants, who stepped up their tariff war efforts in an effort to establish a foothold in the industry and broaden their customer base. Due to the high expense of deploying the network and the relatively small number of subscribers in the early years of operation, the breakeven point for these operators was already three to four years according to industry standards.

This development has further eroded the profits of the current market leaders. In recent years, almost all operators have seen a precipitous drop in profitability. As new operators continue to carve out a niche for

themselves in the market via creative marketing campaigns and very low call rates, we should expect to see price cuts persist in the months ahead. At now, there are fourteen operators vying for a piece of a market that would be best served by four or five competitors, but this trend cannot continue forever and will only hasten the eventual consolidation phase.

The new mergers and acquisitions policy from the Department of Telecommunications (DoT) will begin the consolidation phase. In its suggestions on the licencing framework and spectrum management, TRAI has already laid out its rules for mergers and acquisitions, which include a loosening of the regulations controlling M&A. The telecom industry's consolidation phase is expected to commence in the next year, according to these recommendations.

Many new players have joined the market in recent years as well. This followed an announcement by the Indian telecom regulator TRAI, which said that it will not limit the number of service providers in any one region across January 2008, the Department of Telecommunications (DoT) granted Universal Access Service Licences (UASLs) to five new companies and four existing ones so they may launch GSM-based services across the nation. This was done in accordance with this policy. Uninor, Etisalat DB, STel, Videocon, and Shyam Sistema are among the newcomers that have got licences. Uninor began offering its services in December 2009 over eight of the twenty-one circles that were available to it. Uninor is attempting to carve out a special place for itself by heavy-handed brand promotion, and it has now unveiled a novel idea—dynamic pricing—that would alter the whole tariff structure of the sector. Launching in Orissa, Bihar, and Himachal Pradesh in December 2009, S Tel expects to debut in the other three circles by June 2010.

REVIEW OF LITERATURE

Kim *et al.* (2020) The research looked at Fixed Mobile Convergence (FMC) services as they are now and how they could be used in the future. The study's findings indicate that the services' usefulness, pricing, and the role of customer loyalty all influence their adoption. The findings show that the utility and affordable price of FMC services have a beneficial effect on consumers' adoption of these services, and that customer loyalty to a single operator further strengthens this link. Based on the data collected, the internet access and internet telephone services bundle is the most popular FMC service pack, with 27% of customers using it. The internet access and fixed telephone services bundle comes in second with 12% of customers. For the time being, it seems that people prefer fixed service-based bundles. On the other hand, new FMC service customers are happier with the service pack they're using than with the ones they're not or with the price. Additionally, the survey indicated that mobile communications and internet access services are fundamental to FMC offerings, and that users preferred service packages that included internet TV in addition to mobile communications and internet access.

(Samimi and Ledary, 2020) Globally and in developing nations in particular, investment in information and communication technology (ICT) has enhanced industrial processes, leading to higher output and greater profits. looked at the 30 industrialized nations' statistics from 2001 to 2006 to see how ICT correlated with economic development. Utilising panel data regression models, the research has quantified the Digital potential Index (DOI) along three dimensions: overall potential, infrastructure, and applications. The results indicate a robust relationship between ICT and GDP growth. Therefore, following research recommends

that these nations increase their investment in ICT programmes. Because of their heavy investment in ICTs over the last decade, these nations are predicted to see faster development and the expansion of the "New Economy" this decade, according to the report.

Weick Vidaland. in the year 2020 According to the research, investments in telecommunications may greatly boost the development of related sectors and even spark the birth of whole new economic entities. Government spending on telecommunications accounts for as much as a third of GDP growth. Telecom investment, GDP growth, and employment all show a positive and robust relationship, based on the findings of the study. Financial backing for telecommunications and information infrastructure may mitigate the economic crisis's negative impacts and boost development prospects in the long run, according to these findings. Investments in the telecom industry, similar to investments in physical infrastructure, may help nations recover from the economic crisis, according to the research. Findings demonstrate that employment losses in technology-adopting businesses are more than compensated for by employment gains in technology-producing businesses, their suppliers, and related or new sectors. In addition, there is substantial evidence that the need for skilled labour rises because so many people are using broadband and other forms of digital technology. This is because industries that use these technologies require a higher level of human capital.

Gruber and Koutroumpis (2020) The research have estimated using the 3Stage Least Square GMM model. The research covered the years 1990–2007 and drew on information from 192 nations. Findings show that low penetration nations are less affected by mobile telecommunications infrastructure's ability to boost economic development compared to high penetration countries. The research showed that mobile telecommunications infrastructure contributed twice as much to growth for nations with high incomes as it did for those with low incomes each year. Research shows that improvements to mobile telecommunications infrastructure boost productivity. When considering policymaking considering economic progress as a whole, the consequences of productivity growth are substantial. The paper goes on to say that mobile telecommunications boost economic performance generally and linkages across various economic sectors in particular.Policy initiatives promoting dispersion, liberalisation, and privatisation were widely implemented, according to the research, as a result of the far-reaching effects of mobile telecoms.

In 2020, Biancini The research utilised panel data for the states of India from 1994 to 2004. For the dissemination of mainlines, the research used logistic regression. According to the research, Fixed telephone lines have a greater price elasticity of demand in developing nations like India compared to industrialised nations. Therefore, subsidies could be necessary to guarantee that everyone has access to communications services. Several socioeconomic and demographic variables, including educational attainment, affect the demand for telecommunications services. In developed places, mobile phones have replaced landline phones, leading to a split in service kinds. Efficiency improvements and price reductions are the outcomes of a competitive mobile telephone market that emerges in such settings. Competition in both market categories boosts investment in the telecoms industry, according to the report. Nevertheless, in order to guarantee that everyone has access to telephone services, governmental policy must intervene and subsidise less developed regions.

RESEARCH METHODOLOGY

Primary data for phases A and B were intended to be collected during the pilot study. Finding out how accurate and reliable the questionnaire is, this was carried out.
Instead of more abstract measurements (constructs), the majority of the questions on the survey were more straightforward. Researchers used the two concepts for two abstract measures: the impact of telecom on rural customers and the advantages felt by rural telecom users. The World Trade Organisation (WTO) funded Dr. Rekha Jain's previous study on rural Gujarati consumers, which employed this same set of questions. These two scales were developed by the researcher after she took up the questions. Prior to this, there were no measures to help us comprehend these two facets. To determine conducted the pilot study to ensure the validity and reliability of these measures. We used Cronbach's Alpha and Guttman Split-Half reliability as our metrics. A total of 26 participants were chosen at random from two villages in Maharashtra for the pilot research.

DATA ANALYSIS

Use of Event Study to Assess Impact of Various Government Policies on Telecom Growth

Event study methodology to determine how government telecom policy affected the expansion of the industry. A statistical tool for determining how a one-time occurrence affected a continuing process is known as an event study. After controlling for the dependent variable, the primary goal is to identify the out-of-the-ordinary outcomes caused by the event under investigation.

Accounting, finance, management, economics, marketing, IT, law, politics, and a host of other fields all make use of event studies.

The Impact of various Government policies on telecom diffusion were studied through the secondary data using Event Study Methodology. Given the many limitations of long-horizon event studies, it is crucial to remember that short-horizon event studies are more trustworthy.

The "Market Model Method" (MacKinlay 1997) was used in this research. The model uses following methodology

Step (i) The model requires an estimation window which should be 6 months preceding to the event, and 6 months following the event.

Step (ii) Conclusions drawn from the data for the linked variables and a reference index (event date) a regression analysis is done. The equation is fitted and the slope and the intercept are calculated.

Step (iii) The abnormal estimates are computed by projecting the normal values using the regression coefficients.

Step (iv) These actual and estimates are tested using paired t test for significant difference. Positive significant difference would mean positive effect of the event and any negative significant effect would mean negative effect of the event. No significant effect would mean no effect of the event.

Ten events were considered for event study. Six events were found to have no significant effect on telecom growth. Six events were determined to significantly affect the expansion of telecom networks.

Event Study for NTP99 Policy Event

NTP 99 was introduced in April 1999 this was a revolutionary policy for Indian telecom industry as the policy moved from a system of expensive fixed license fees to one of inexpensive revenue sharing, which in turn completely changed the Indian telecom industry.

These are the steps involved in the methodology:

Step (i) the event date is April 1999 hence the monthly data considered for the study was from March 1997 to October 1999 (6 months after the event). The subscriber data was used for the study, the growth rate was calculated for each of the months from April 1997 to October 1999. The timeline is explained on Figure 1

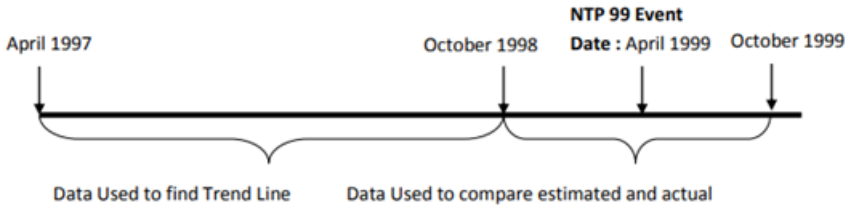

Figure 1 Event Study time line for NTP99 event

Step (ii) A trend equation is fitted on the growth rate from April 1997 to September 1998 (6 Months prior to the event)

Cook's distance methodology is used for removing any outliers for the trend. To find out how much a single case's exclusion from regression coefficient calculations might affect all other instances' residuals, one may use Cook's distance as a metric. Excluding a case from the regression statistics calculation significantly alters the coefficients if the cook's distance is considerable.

After 6 iterations the resultant output is depicted in Table 1

Table 1 Model Summary[b], ANOVA and Coefficients for Trend on Growth rate from April 1997 to September 1998

R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
.764[a]	.583	.562	2.50863	1.59

a. Predictors: (Constant), Period in Months

b. Dependent Variable: Growth Subscribers

ANOVA[b]

Model		Sum of Squares	Df	Mean Square	F	Sig.
	Regression	176.167	1	176.167	27.993	.000[a]
	Residual	125.864	20	6.293		
	Total	302.031	21			

a. Predictors: (Constant), Period in Months

b. Dependent Variable: Growth Subscribers

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	CollinearityStatistics	
	B	Std. Error	zeta			Tolerance	VIF
(Constant)	11.408	1.151		9.911	.000		
Period in Months	-.421	.080	-.764	-5.291	.000	1.000	1.000

a. Dependent Variable: Growth Subscribers

It may be noted that though the subscribers are increasing in number, however rate at which they are increasing is decreasing, therefore a negative beta coefficient. The rate of growth is often affected by base. Initially, due to low penetration, the base was small and even a small increase when the subscriber base expands, the expansion rate by considerable amount. In the later stage, as the base increases, the rate of growth starts decreasing.

The trend equation used for the first event study is as follows

$Y = 11.408 – 0.421 \times X$

Where Y = Growth Rate and X = period in Months

Step (iii) Based on $Y = 11.408 – 0.421 \times X$, the growth rate is estimated for the periods October 1998 to October 1999. Next, the real growth rate is contrasted with the predicted one.

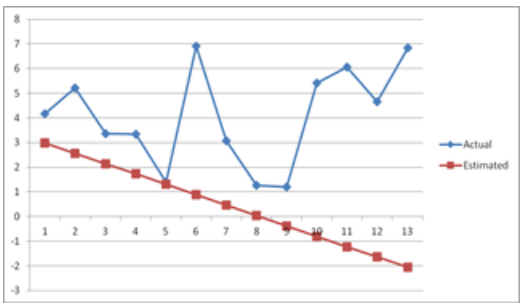

Figure 2 Actual Vs Estimated for NTP99 Policy

Step (iv) To test the statistical significance, dependent sample t- test (paired t- test) is used. The hypothesis can be set as,

H0: There is no difference between the estimated growth rate and actual growth rate when the NTP 99 was introduced

H1: There is significant difference between the estimated growth rate and actual growth rate when the NTP 99 was introduced

Table 2 T-Test for difference between the estimated growth rate and actual growth rate when the NTP 99 was introduced

		Mean	N	Std. Deviation
NTP 99	Growth Rate (Actual)	3.3002	13	4.06668
	Growth Rate (Expected)	.4620	13	1.63956

Paired Samples Test

		Paired Differences	t	df	Sig. (2-

Paired Samples Test

Event		Mean	Std. Error Mean			tailed)
NTP 99	Growth Rate actual - Growth Rate expected	2.8381 8	1.02546	2.77	12	0.009

Since the Significance value (0.009) is less than the significance level of 1%, we may reject the null hypothesis that the real and projected growth rates are identical. When we compare the real and anticipated growth rates at 1% LOS, we find a considerable discrepancy. When comparing the actual and anticipated growth rates, it is clear that the former is higher significantly increased due to the event. The average increase was 2.84% over the estimated growth rate.

Event Study for 'Setting up of BSNL' Event

The Department of Telecom (DoT) with the intent to boost rural telecom proceeded to establish a company in BSNL in September 2000 with the mandate to promote rural telecom growth. DoT also gave targets to operators to do 15% of business in the countryside. Consequently, the rural sector received a boost is studied as below

These are the steps involved in the methodology:

Step (i) the event date is September 2000 hence the monthly data considered for the study was from March 1997 to March 2001 (6 months after the event). The subscriber data was used for the study, the growth rate was calculated for each of the months from April 1997 to February 2000. The timeline is explained on Figure 3

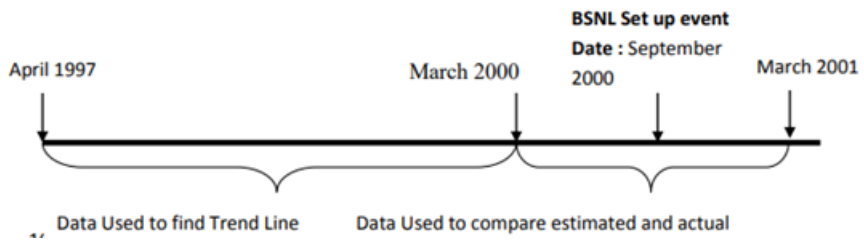

Figure 3 Event Study time line for Establishment of BSNL Event

Step (ii) A trend equation is fitted on the growth rate from April 1997 to February 2000 (6 Months prior to the event)

Cook's distance methodology is used for removing any outliers for the trend. To find out how much a single case's exclusion from regression coefficient calculations might affect all other instances' residuals, one may use Cook's distance as a metric. Excluding a case from the regression statistics calculation significantly alters the coefficients if the cook's distance is considerable.

After 3 iterations the resultant output is depicted in Table 3

Table 3 Coefficients for Trend on Growth rate from April 1997 to February 2000

Event		Unstandardized Coefficients		T	Sig.	Collinearity Statistics	
		B	Std. Error			Tolerance	VIF
BSNL Set up	(Constant)	7.123	1.042	6.838	.000		
	Period in Months	-.095	.027	-3.482	.008	1.000	1.000

The trend equation used for the first event study is as follows

$Y = 7.123 - 0.095 \times X$

Where Y = Growth Rate and X = period in Months

Step (iii) Based on $Y = 7.123 - 0.095 \times X$, the growth rate is estimated for the periods March 2000 to March 2001. Next, we compare the actual growth rate to the estimated one.

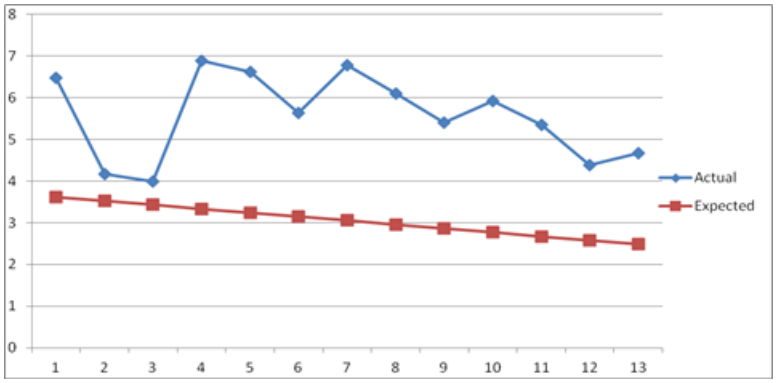

Figure 4 Actual Vs Estimated for Set up of BSNL Event

Step (iv) To test the statistical significance, dependent sample t- test (paired t- test) is used. The hypothesis can be set as,

H0 : There is no difference between the estimated growth rate and actual growth rate when the BSNL was

set up by DoT

H1 : There is significant difference between the estimated growth rate and actual growth rate when the BSNL was set up by DoT

Table 4 T-Test for difference between the estimated growth rate and actual growth rate for Set up of BSNL Event

		Mean	N	Std. Deviation
BSNL Set byDoT	Growth Rate (Actual)	5.5671	13	1.01112
	Growth Rate (Expected)	-6.6950	13	1.63956

Paired Samples Test

Event		Paired Differences		t	df	Sig. (2-tailed)
		Mean	Std. Error Mean			
BSNL Set byDoT	Actual Growth Rate - Expected Growth Rate	12.262 13	0.485 7	25.24 6	12	0

Since the Significance value (0.000) is less than the significance level of 1%, we may reject the null hypothesis that the real and projected growth rates are identical. When we compare the real and anticipated growth rates at 1% LOS, we find a considerable discrepancy. A considerable rise in the growth rate is indicated by the fact that the actual growth rate is more than the predicted growth rate, on average due to the event.

Thus, the establishment of BSNL by DoT showed significant increase in tele-density growth. The average increase was 12.26% over the previous period.

CONCLUSIONS

The research has helped clarify the service provider's and rural customer's points of view, allowing them to better grasp the needs that will increase facility use and pique their interest in this promising field. Promoting the expansion of telecom and its extension to rural regions has been a governmental mandate since the telecom industry was made available for privatization. But thus far, efforts to support the expansion surge with financial resources have yielded outcomes that aren't good enough to keep the company afloat. There has been a chronic underutilization of the funds allocated to the support function, leading to an ever-increasing excess that has served no useful purpose. Spending money wisely comes from the need to make the most of what we have. Historically, projects that have received funding have gradually lost their usefulness, turning our efforts into fleeting peaks of success that quickly disappear.

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