



Impact of Telecommunication on Economic Growth: An empirical Investigation

K. Devadas
Research scholar
Department of Economics
Osmania university, Hyderabad

1. Introduction

The Indian Telecom Industry is considered to be a vital tool for the development of the country on the whole by contributing towards the immense growth, quick expansion and up gradation of various sectors of the nation. This industry increases the GDP of India, earns profit for the Indian Government and creates employment opportunities for a great number of people. The Indian Telecom Industry is very huge consisting of companies that make hardware and also produce software. Presently, it contributes to revenue of USD 33, 500 million. Along with the Government owned telecom units, the Indian Telecom market has also attracted many private operators to enter here who started offering their telecom services as fixed communication, mobile communication and data services to the customers at the most reasonable prices.

The Government of India has adopted several measures to provide a business-friendly environment for companies in the Indian Telecom market while competing with each other. Due to the rapid advancement in technologies, the telecom operators of India are working actively in order to adapt themselves to the changing technology to continue existing in the market. The Indian Telecom Industry has grown tremendously during the past few years owing to the unprecedented growth of wireless telephony in India and infrastructure which not only is beneficial for the telecom industry but has positive effects on the entire economy of India. The industry has the world's third highest number of internet users. The Indian Telecom Industry has undergone a considerable transformation



from being a government owned enterprise to that of a competitive environment after its liberalization in 1991. The rapid escalation in the telecom sector of India has been made possible due to the active participation of private service providers, revenue generated through Foreign Direct Investment (FDI), series of reforms instigated by the Government and through the adoption of latest technologies.

2. Review of literature

Telecom sector plays a vital role in boosting an economy thus it is important to understand the role and contribution of telecom sector to the growth of economy. Some studies identified that telecom industry increases revenue, lower production cost and increase employment. With regard to the linkage between the telecommunication and economic growth, the existence studies found a positive relationship between telecommunication and economic growth. Increase telephone connections increases knowledge and information which leads to increase efficiency of production and improvement in service.

Tripathi and Inani (2020) have examined the impact of information and communication technology on economic growth for SAARC countries including Bangladesh, India, Pakistan and Sri Lanka. The sample contains yearly observations for the period of 1990 to 2014. The study employed augmented Cobb-Douglas production function and empirical findings confirm information and communication technology have positive and significant effect on economic growth for these countries.

Olalekan and David (2019) have investigated robustness of the evidence on telecommunication infrastructure, economic growth and development of 46 countries in Africa. All the variables were measured at yearly frequencies over the period 2000 to 2015. They have employed panel cointegration test and panel causality test. The empirical findings



confirm that there is a bidirectional causality relationship between the telecommunication infrastructures, economic growth and development. Their study concluded that telecom industry infrastructures promote economic growth and development in Africa.

Tanyai (2019) investigates the causal relationship between telephone connection and economic growth in Kenya. The sample contains yearly observations for the period 1988 to 2018. He adopts augmented Solow Swan model. The study also employed cointegration test for long run relationship and error correction model for short run. The results confirm that all the variables are co integrated. The speed of adjustment in the short run and long run was 65.4 %. The study concludes that promotes the telecommunication sector would increase economic growth in Kenya.

Butt (2018) has examined the effect of motivational factors on job satisfaction of administrative staff in telecom sector of Pakistan. The sample size of the study was 150 administrative staff members and 75 for Telenor and 75 for U-Fone. The study employed correlation and linear regression method. The empirical findings reveal that the job satisfaction was same in Telenor and U-Fone. The study also found that telecom motivation factors are positive impact on job satisfaction in Pakistan.

Kiani (2018) has investigated the causal relationship between telecommunication and economic growth in Pakistan. The sample includes yearly data from 1996 to 2016. He employed Ordinary Least Square (OLS) method to explore the relationship between the variables. The empirical results confirm the positive relationship between telecom sector and economic growth in Pakistan.

Sharif (2017)'s study undertakes on extensive statistical investigation on telecommunication and its impact on the SAARC countries namely Bangladesh, India, Pakistan, Sri Lanka, and



Nepal. The study covers the period from 1975 to 2015. He employed ordinary least square (OLS) method to predict the relationship between economic growth, tele density, investment in telecommunication sector, revenue from telecom industry, revenue percentage of GDP and internet users. The empirical results reveal that the telecommunications industry has positive and strong relationship with economic growth in SAARC countries.

Pradhan et al. (2016) investigate the causal relationship between economic growth development of telecommunication infrastructure and financial development in 21 Asian countries. The study employs yearly observations during the period of 1991 to 2012. They used panel unit root test to estimate the degrees of integration among the variables. The authors employed panel cointegration test to estimate the long run equilibrium relationship between the variables. The study also employed panel granger causality test to ascertain the direction of causal relationship between the variables. The obtained results confirm that there is granger causality among the variables in the short run and long run in Asia.

Sharif (2016) has examined the role of telecommunication over the economic development of Bangladesh. The study uses yearly data for the period of 1975 to 2015. He employed ordinary least square (OLS) method. The estimated results show that telecommunication has significant and positive association with economic development in Bangladesh.

3. Data and methodology

The aim of this paper is examining the relationship between telecommunication and economic growth in India for the span of 2001 to 2019. The measurement of all the variables as follows: GDP (constant LCU), Tele density, portable cellular subscriptions (per 100 people), Fixed telephone subscriptions (per 100 people), Fixed broadband subscriptions (per 100 people), Mobile cellular subscriptions, rigid telephone subscription and Fixed broadband



subscriptions. The data obtained from WDI (World Development Indicators), 2019. The variables are transformed into natural logarithms. The study employed descriptive statistics, correlations, Unit root test and Ordinary Least Square Method (OLS).

4. Empirical Results

Telecom sector plying a vital role in economic development in terms of employment generation, increase in income and improve in infrastructure. However, in the process of liberalization, the sector has got rapid changes due to technological changes, international mobilization of finance, tariff restructuring. Thus, Telecom sector in the future will also be an important sector for rural/agricultural and industrial sector in our economy. The telecommunication expansion has been found one of the reasons that affect economic growth and its input varies between countries at different stages of development.

The review statistics of actual values of economic growth, permanent telephone subscriptions, fixed broadband subscriptions and mobile cellular of India are resented in Table-1. More specifically, we reported the information on the mean, standard deviation, skewers coefficient, kurtosis coefficient, the Jarque-Bera normality test, and the probability. Skewness helps us to conclude the nature and extent of the concentration of the observations towards the highest or the lowest values of the variables.

Here the skewness values of all the variables are negative (except economic growth) which indicates that the frequency curve of all the sharing is symmetric bell-shaped curve. Kurtosis is concentrated with the flatness or peakedness of frequency curve. Here the kurtosis values of economic growth, tele-density, fixed telephone subscriptions, fixed broadband subscriptions and mobile cellular subscriptions are less than 3, which indicate that these



variables have normal kurtosis. also, the Jarque-Bera test marker reveals the typical non-normality quality of high frequency.

Table.4.1 Descriptive Statistics

Variables	Mean	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	P-value
<i>GDP</i>	8.72	3.20	0.41	1.96	1.39	0.49
<i>TELED</i>	48.05	35.43	-0.06	1.29	2.32	0.31
<i>FTS</i>	10.39	1.45	0.08	2.34	0.35	0.83
<i>FBS</i>	9562	7586	-0.08	1.33	2.22	0.32
<i>MCS</i>	6.02	4.56	-0.114	1.36	2.18	0.33

4.2. Unit Root Test (Augmented Dickey and Fuller (ADF - 1979))

Before going to estimate any econometric model, we have to apply unit root tests on time series data because it is important in examining the stationary of a time series. There are several tests are identified in literature for testing unit root tests, some of them are augmented Dickey and Fuller (ADF) (1979) and the Phillips and Perron (PP) (1988). In order to check the stationary properties of variables the Augmented Dickey and Fuller (ADF) test applied.

Table 4.2 presents the estimated results of unit root test at levels and first difference of Augmented Dickey Fuller (ADF) test. The estimated results divulge that all variables are non-stationary in their level form. However, all the series are stationary at first differences. Thus, we reject the null hypothesis of non-stationary at 1% level, 5% level of significance.



Table.4.2:

Results of Unit Root Tests

Variables	Augmented Dickey-Fuller (ADF) Test			
	Level	Inference	First Difference	Inference
lnGDP	-0.384 (0.892)	I (0)	-3.941 (0.009) *	I (1)
lnTELED	-2.509 (0.130)	I (0)	-3.716 (0.014) *	I (1)
lnFBS	-2.144 (0.231)	I (0)	-3.276 (0.032) **	I (1)
lnMCS	-1.461 (0.527)	I (0)	-8.980 (0.000) *	I (1)

Note: * and ** denotes that 1% and 5% level of significance.

The estimated correlation results reported in Table 4.3. The results shows that Tele-density, fixed broadband subscriptions and mobile cellular subscriptions have positive relationship with economic growth and highly significant. The tele-density has highly positive correlation with economic growth by 0.945. This implies that the tele-density contributes 0.94% to economic growth in India. The estimated results reveal that tele-density, fixed broadband subscriptions and mobile cellular subscriptions were positively associated with economic growth in India.

Table 4.3
Correlations

Variables	GDP	TELED	FBS	MCS
GDP	1	0.945	0.898	0.908
TELED	0.945	1	0.970	0.975
FBS	0.898	0.970	1	0.991
MCS	0.908	0.975	0.991	1



The Ordinary Least Square method (OLS) results were reported in Table 4.4. The estimated value of the intercept which is 27.366 shows that the Indian economy will experience a 27.366 increase all other variables are held constant. The estimated results reveal that a one per cent increase in Tele-density will cause a 0.07 per cent increase in economic growth, mobile cellular subscriptions shows that a one per cent increase in mobile cellular subscriptions will cause 0.061 increases in economic growth. The estimated results confirm that a one per cent increase in fixed broadband subscriptions leads to increase economic growth by 0.015 per cent. Overall, the estimated results concludes that Tele-density, Mobile Cellular Subscriptions and Fixed Broadband Subscriptions were positive impact on economic growth in India

Table 4.4
Ordinary Least Square results (Dependent variable: Economic Growth)

<i>Variables</i>	<i>Coefficient</i>	<i>t-Statistic</i>	<i>Prob.</i>
<i>Constant</i>	27.366	10.742	0.000
<i>lnTELED</i>	0.007	5.928	0.000
<i>lnMCS</i>	0.061	2.237	0.039
<i>lnFBS</i>	0.015	8.462	0.000

5. Conclusion

This chapter examines the impact of telecom sector on economic growth in India during the period from 2001 to 2019. The study employed descriptive statistics, correlations, unit root test and Ordinary Least Square method. The correlations result shows that Tele-density, fixed broadband subscriptions and mobile cellular subscriptions have positive and significant



relationship with economic growth. The estimated results divulge that all variables are non-stationary in their level form. However, all the series are stationary at first differences. The OLS estimated results reveal that the estimated results conclude that Tele-density, Mobile Cellular Subscriptions and Fixed Broadband Subscriptions were positive impact on economic growth in India.

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