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An Exploratory Study of Telecommunication Sector for Selected Countries

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Abstract

Telecom industry has been growing in revenue every year. With multiple players in the market, prices of telecommunication services are a key issue for competition and regulatory authorities. Telecommunication industry has been following a trend of falling unit price which has been benefiting the customer. The dip in the unit prices has been due to dynamic and static reasons at various pockets of the world. This research paper aims at identifying those static and dynamic parameters that has led to this dip. The collected database of 13 countries with reference to wireless market intends to show that investment is the driver of exponential growth of traffic in the telecommunication industry. The process has also led to decrease in price of data drastically due to the growth of a lowered growth rate of revenue. The increased margin leads to a jump in subscription price and investment simultaneously. This paper also focuses on impact on subscription price due to impact on investment. The research paper results in decrease in price of data thereby allowing consumers to benefit from a higher bit rate for a pretty steady price. This improvement also benefits to service and content providers that may provide more services and more contents.

Keywords: Data, Investment, Telecommunication, Wireless

1. Introduction

Telecommunication industry has grown at a fast pace in the past decade and there are multiple players existing in the market. The industry has a significant impact on any country's economy. The growth of telecommunication industry also envisages development and contributes towards the key economic indicators of any country (Röller, 2001[13]; Datta, 2004[2]; Wavermann and Meschi, 2005[16]). Price of unit of consumption is one of the key indicators used to compare the price of services offered by telecommunication industry in due course of time. There could be other indicators like subscription prices, volume of data transferred etc., but they revolve around the basic indicator "price per unit" of consumption. It is also seen that the services offered by the telecommunication industry vary in every country and the variation is also observed over time. The unit of measurement and comparison thus needs to be common which is uniform across time and geography. Thus, usage of services in minutes or data (Mbytes) is the basic parameter to study and understand the usage of services by any industry, country or an individual. A minute of call or a Mbyte of data therefore is a uniform unit of measurement and can be used to study the performance of telecommunication industry.

Studies have found out that due to competition and development of new technologies, prices of telecommunication services has fallen over time. The world has also witnessed increase in number of subscribers of these services. The perennial debate between the increasing competition and falling prices is

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driven by the answer to a question: What are the factors causing a fall in the prices and what strategy should the companies follow to increase the subscribers? The questions can be further extended to finding reasons for fall in prices of unit of telecommunication as well. The factors although may be many, but the proportion of their influence will be different for each country and every operator. The paper therefore aims in drawing out such factors and understanding the relationship between these factors both theoretically and empirically. The paper also studies impact of investment in reducing the cost of per unit of services. The study incorporates a study of 13 countries from the Asia pacific region and the study spans over from 2008-2012. Secondary data is used for finding out relations between the dependent and independent variables.

The study intrigues with the fact that investment is one of the key drivers for reduction in prices of telecommunication network. The policy recommendations thus, would be revolving around smart investment of money and having a balance between the various services offered by the telecommunications. It is observed that current margin impacts unit price positively while a decrease in the unit price of the services is observed with an increase in traffic in the system. As traffic in telecommunication is a dynamic concept, its impact on the data is worthwhile to be studied. Studies also indicate that higher margins affect the unit price along with the investment. The competition in the market if regularised can carefully settle in order to have a trade off between unit prices and investments.

The world has been experiencing a drift in the technological advances especially in the telecommunication industry. In the past few decades, the world has witnessed a phenomenal progress in the investment in the telecom industry. The progress rate is relatively steep and is close to the tune of 20 to 30 percent on an average for the information and communication technologies worldwide (Koh and Magee, 2006[10]). The rate of growth is more than the other important sector like energy which has been only growing at an average rate of 6 percent annually (Koh and Magee, 2008[11]). The growth is multi-dimensional and investment has been constantly increasing in the sector. In the past 3 decades, investors have increased their stake in this industry which has helped in progressive growth of the industry (Doms, 2004[3]). Investment has not only helped improve the quality of transmission of voice of internet data, but also has contributed towards the satisfaction of customers and better rate of return for the investors (Jeanjean, Competition through Technical Progress, 2011[7]). The equation as looks simple is not so, as competition is a variable which cannot be measured, but felt. The effect of competition on the investment encounters a "escape competition effect" while it also deters investment thereby reducing the expected gains in future. Thus, a downward opening parabolic relation can be seen between investment and completion in the telecom industry. The relation between innovation and competition is replicated and extended for investment and competition by several studies (Friederiszick et al., 2008[4]; Kim et al., 2011[9]).

The paper is organised as follows. Second section gives an overview of the dataset which is followed by third section indicating the relation between investment and rate of growth of traffic for the country. The fourth section explains the variable price per Mbyte on the basis of traffic growth, cost and margins. The results are also discussed in detail in this section which is related to the domination of traffic growth by cost and margins. The fifth section explains the ambiguous impact of margin while the last section concludes the paper and explains the policy recommendations from the analysis.

2. Investment is a Driver of Traffic in Telecom Industry

The telecom industry is expanding in all directions and the growth is exponential in nature. The development and growth is observed in wireless sector (Cisco Networking Index). The growth is observed across all sectors especially information and communication technology (Tague et al., 1981[15]; Schummer, 1997[14]). An important point worth thinking is the reason behind this growth. The reasons could be many, which can be both internal and external in nature. The role of market competition and innovations in the telecom industry has made this area dynamic and studying these factors is therefore important. The customer base of the telecom companies has been increasing and therefore the investment to manage the requirements of the customers has also gone up. It is observed that capital requirements for these customers are increasing and investors thus have started pooling in money. Investment thus plays a crucial role to cater the logistics of the industry thereby catering to the demand of the customers and managing the

increasing completion and traffic. The growth in traffic and increase in competition has captured the attention of many researchers. The investment of these companies is relatively stable while the demands of customers and their base are dynamic in nature. It is therefore important to study the discrepancies occurred due to mismatch in the static and dynamic investments. Also, the relation between the dynamic factors like competition and traffic has also been a topic of interest of recent studies.

Thus, to study this problem, it is worthwhile to pause at the production function equation proposed by Griliches (Griliches, 1979[6]; Jeanjean, 2013[5]). The equation helps in calculating Productivity growth which is a function of stock of capital (C), labour cost (L), measure of current technical knowledge (S).

$$Y = DC^{\omega} L^{\beta} S^{\gamma} e^{\mu t+u} \quad \text{(E1)}$$

D, ω, β, γ and μ are constant and positive parameters, t is the time index and u represents the unmeasured determinants of output assumed to be random.

The exponential growth of traffic can be measured using the equation. K in this equation is a representative of stock of capital and is a combination of human and technical knowledge as well. The remaining notations are discussed above. Traffic can thus be equated as. At time t =0, the equation transforms into where, and represents the values of T, K and u respectively. The randomness of U and therefore its revised version leads to the a new error term (Jeanjean, 2013[5]). The logarithmic version can be written as follows:

$$\ln\left(\frac{T}{T_o}\right) = \partial(K - K_o) + \mu t + \in$$

Let us denote $\alpha = \delta + \frac{\mu}{K_o}$ and. $\varphi + \frac{\delta}{\alpha}$ The above expression then becomes:-

$$\ln\left(\frac{T}{T_o}\right) = \alpha\left[\varphi(K - K_o) + (1-\varphi)K_o t\right] + \in \quad \text{(E2)}$$

φ denotes the relative impact of time and stock of capital on the output. He output is therefore a function of both the variables and it is worthwhile to note that their relationship is not simple. Stock of capital has a slow and sluggish impact on human and knowledge capital when compared with impact of time.

If $\varphi = 0$, $\left(\frac{T}{T_o}\right) = \alpha K_o t + \varepsilon$. In such a case, the growth of traffic is only driven by time following an imitation process. The growth of traffic is proportional to the current traffic. $\frac{dT}{dt} = \alpha K_o t$ Notice that the coefficient of growth is proportional to the initial stock of capital.

If $\varphi = \left(\frac{T}{T_o}\right) = \alpha(K - K_o) + \varepsilon$. In such a case, the growth of traffic is only driven by the stock of capital; K. the stock of capital depends on investment. Investment improves the quality of service for the customers, encouraging them to increase their consumption. In that case, the growth of traffic generated by an investment is proportional to the current traffic.

If $K = K_o(t+1)$ which means that the stock of the capital increases regularly, $\Delta K = K_0$, then the equation of the traffic does not depend any more on φ. The two previous cases merge.

The equations can be further polished with certain assumptions and it is therefore important to carefully study of the same. The variable "K" can be thus assumed as combination of human capital and embodied knowledge and is thus called the "stock of capital". The human resource investment s would include training of staff while a technical back up needs to be kept ready which is also a simultaneous requirement for expanding the territory of the network. The study is incorporated for a short span of 5 years and thus neglects the cost of depreciation of the machinery and other equipments. Also, the study does not relate to any specific unit of installation which is commonly available in all the countries. Therefore, the level of innovation is also skipped while calculating the output.

Data in real life shows that there is a variation in the rate of investment as well. The amount of investment is dependent on the consumers and their demands. Therefore K at time t = 0 is close to $K_o(t+1)$ which indirectly points out that φ does not play a major role. The concern still lies in understanding the intrigue relationship between rate of growth of traffic and investment made in a telecom company. The problem of which variable being independent and dependent is a degree of concern for this research as well. The possibility of traffic attracting heavy investments and vice versa is equally justified. The difference between K and $K_o(t+1)$ is denoted by k which is difference between actual and regular investment made by companies. Thus Equation (2) can be rewritten as:

$$\left(\frac{T}{T_o}\right) = \alpha\left[\varphi k + K_o t\right] + \varepsilon \quad \text{(E3)}$$

It is important to understand that elasticity is proportional to. With its value equal to zero, the results reveal that there is a growth in traffic and investment also grows accordingly with the same pace. The initial

investment is different for different operators and it does not significantly contribute to the traffic growth. Alternatively, the diffusion of continuous investment and increasing competition together leads to significantly growth in traffic. The growth of traffic is maximum at, $\varphi = 1$ which causes the maximum impact as well. Therefore, the value of φ should not have a major impact on the value of. α The estimation of coefficient for each of the 13 countries is different for different values of φ and can be calculated using OLS (Ordinary Least Square) regression along with the following model (Jeanjean, 2013[5]):

$$\left(\frac{T_{i,t}}{T_{oi,t}}\right) = \alpha_i\left[\varphi k_{i,t} + K_{o_i} t\right] + \varepsilon_{i,t} \qquad \text{(E4)}$$

The results are reported in the following table below (Table 1)

The table above gives a brief overview of the impact on investment on the traffic for the 13 Asia Pacific countries. The rate of growth of traffic is close to 45 percent. The corresponding value of R-square around this rate of growth is also maximum which indicates a positive sign. The table also signifies that all the coefficients are significant and the value of R-Square is all close to 1. The closeness of value to 1 confirms a parabolic exponential relationship between rate of growth of traffic and cumulative investment made by the countries. It is also found that an increase in investment does not instantly leads to the growth of traffic. It follows a ripple effect and thus there is a delay in the process as well. The duration of this delay is tough to measure and the role of competition and investment by other players are impossible to account.

3. Data Set

The study used secondary data of 13 countries from Asia – Pacific region in the time span of 5 years (2008-12). The traffic of every country is derived from Informa Intelligence Centre annually. EBITDA and total revenues were calculated from the data taken from "World Cellular Information Services". The data is provided on a quarterly basis and is annualized in the paper. Capex per country in millions $US are provided by Yankee group on an annual basis under the category of "Asia-Pacific Mobile Carrier Monitor". Capex and investment are treated as synonyms in the paper (Jeanjean, 2013[5]).

The data for the user base for the countries are provided by Strategy Analytics using a report titled "Word-wide Cellular User Forecasts 2012-2017". Table 2 gives a descriptive description of the variables collected from the secondary sources for the 13 countries in Asia Pacific region. The results reveal that there is an

Table 1. Impact of Investment on Traffic per country

Λ	0	0.2	0.4	0.45	0.5	0.6	0.8	1
Variables, α	ln(T/To)	ln(T/To)	ln(T/To)	ln(T/To)	ln(T/To)	ln(T/To)	ln(T/To)	ln(T/To)
Cambodia	0.000456***	0.000412***	0.000414***	0.000421***	0.000414***	0.000414***	0.000413***	0.000412***
Indonesia	0.000543***	0.000423***	0.000426***	0.000426***	0.000426***	0.000425***	0.000423***	0.000421***
North Korea	0.000232***	0.000312***	0.000321***	0.000324***	0.000323***	0.000323***	0.000324***	0.000341***
South Korea	0.000295***	0.000361***	0.000363***	0.000362***	0.000363***	0.000363***	0.000321***	0.000216***
Australia	0.000123***	0.000145***	0.000145***	0.000145***	0.000145***	0.000145***	0.000147***	0.000132***
Malaysia	0.000873***	0.000763***	0.000213***	0.000221***	0.000221***	0.000226***	0.000229***	0.000258***
New Zealand	0.000324***	0.000023***	0.000212***	0.000133***	0.000213***	0.000123***	0.000223***	0.000176***
Thailand	0.000284***	0.000184***	0.000166***	0.000165***	0.000378***	0.000129***	0.000468***	0.000324***
Philippines	0.000114***	0.000342***	0.000125***	0.000212***	0.000427***	0.000555***	0.000147***	0.000246***
Japan	0.000034***	0.000033***	0.000033***	0.000033***	0.000033***	0.000035***	0.000033***	0.000035***
Thailand	0.000439***	0.000346***	0.000342***	0.000219***	0.000431***	0.000127***	0.000219***	0.000099***
China	0.000017***	0.000015***	0.000014***	0.000014***	0.000014***	0.000014***	0.000012***	0.000013***
India	0.000161***	0.000157***	0.000153***	0.000152***	0.000154***	0.000146***	0.000141***	0.000143***
Observations	65	65	65	65	65	65	65	65
R-Squared	0.9912	0.9898	0.9821	0.9892	0.9904	0.9912	0.9921	0.9913
F	421.12	432.56	415.94	424.51	424.50	414.62	418.80	410.35

*** p<0.01, ** p<0.05, * p<0.1

Table 2. Descriptive Statistics of Sample of 13 countries

Country	*Variable*	*Revenues*	*EBITDA*	*Capex*	*Costs*	*Traffic*	*Users*	*Price/MByte*
	unit	**millions $US**	**millions $US**	**millions $US**	**millions $US**	**millions MBytes**	**millions**	**$US**
All	Mean	51245	19034	9204	31345	213612	16123	0.4590
	Median	31345	12062	4345	20562	124560	5679	0.3012
	Std dev	49124	14324	4590	28903	324902	19134	0.4523
	Min	11038	4035	1459	10789	7765	160	0.0421
	Max	271021	62345	43450	134598	2145890	81249	2.65234
	CAGR 2008-2012	2.4%	1.1%	4.2%	4.1%	83%	12.5%	-52.5%
	Observations	65	65	65	65	65	65	65

exponential growth in the traffic in each country whiles other variables more moderately. The reason behind the exponential growth could be high investment and an increase in the consumer base in each of the countries. Countries like Australia and New Zealand experience decrease in EBITDA while other countries experienced an increase. The developing and the under developed countries like India, China and Indonesia is relatively lower than the developed countries. The rate at which traffic grows is much higher than the growth of the revenue which has resulted in extrapolated growth of internet services, thereby resulting in steep decrease in prices of MByte. The next section calculates the estimate price of per unit of MByte.

4. Calculation of Price of MByte

Unit Price may (U_p)be expressed as the ratio between Revenue, R and traffic, $T: U_p = \frac{R}{T}$ The expression simply means that there is an inverse relation between unit price and traffic while the relationship is positive between Unit price and revenue. The relationship between EBITDA (E) , operating cost (C) and revenues write E = R- C, the Lerner index L is defined as $L = \frac{E}{R}$. As a result, the Revenue $R = \frac{C}{1-L}$ is where (1-L) represents a proxy of competition intensity. Equation (3) provides the traffic expression: $T = T_o e^{\alpha(\varphi k + K_o t)}$ (Jeanjean, 2013[5])

Therefore, the unit price can be written as:-

$$U_p = \frac{C}{T_o(1-L)} e^{-\alpha(\varphi k + K_o t)} \quad \text{(E5)}$$

The contribution of each variable to the unit price is driven by the elasticity:

$$\varepsilon_k = \frac{\partial U_p}{\partial k}\frac{k}{U_p} = -\varphi\alpha k \quad \text{(E6)}$$

$$\varepsilon(1-L) = \frac{\partial U_p}{\partial (1-L)}\frac{(1-L)}{U_p} = -1$$

$$\varepsilon_k = \frac{\partial U_p}{\partial k}\frac{k}{U_p} = -\varphi\alpha k$$

$$\varepsilon_t = \frac{\partial U_p}{\partial t}\frac{t}{U_p} = -\alpha K_o t$$

The above equations give a fair idea of elasticity of the various variables. It is important to note that the values are constant for competition and operating cost of the telecom services. The elasticity was found to have a negative relation with time for investments. An increase in the absolute value of investments or fluctuations in the same caused a steep decrease in the elasticity.

It is also found that the operating cost has a positive sign for elasticity. A direct relationship is thus seen between the unit price and operating cost. On the contrary, the relationship between competition and unit price is found to be negative as there exist a negative sign against the value of elasticity. Competition is a dynamic concept and with an increasing value of the same, the EBITDA is affected. The reduction in EBITDA causes a dip in the value of unit price as well. Unit prices are also affected by traffic. An increase in investment causes an increase in traffic and thus leads to dip in the unit prices. It is also evident from the sign of the investment elasticity which is negative. The results also indicate that the impact of competition and operating cost are static in nature which means that the elasticity is unity

for them. On the other hand, the impact of investment is dynamic in nature and therefore increases over time. The dynamic effect thus overpowers the static power in due course of time. It is important to keep in mind that competition and operating costs keep on changing with time as it is difficult to predict the moves of other players. The effect of varying competition and operating cost leads to a dynamic effect on unit prices while the investment will have a static effect. The investment tends to increase every year as there is an increasing customer base and to maintain them and generate profits, investments need to be pumped up. Thus, in due course of time, the static effects will be outnumbered by dynamic effects. The study also witnessed the same. The dynamic effects have been powerful, while the static effects are comparatively negligible.

The data taken from the secondary sources as mentioned are used to determine the actual contribution of each of the parameters. These parameters are responsible in the fall in the unit price for the time period 2008-12 for the 13 countries. Equation (5) can be further transformed to get the required calculation (Jeanjean, 2013[5]):

$$\ln\left(\frac{U_{p4}}{U_{po}}\right)=\ln\left(\frac{C_4}{C_o}\right)-\ln\left(\frac{(1-L)_4}{(1-L)_0}\right)-\alpha\left[\varphi k+4K_o\right] \quad \text{(E7)}$$

The value of each term represents the relative change of one parameter during 2008 and 2012. The value of is set to 0.45; as it maximizes the explanation power of Equation (4), however, given the strong correlation between the cumulative investment and time, the results are not very sensitive to changes in . The following table provides the results for each country:

Table 3. Contributions to the fall in unit price

Country	$\ln\left(\frac{C_4}{C_o}\right)-\ln\left(\frac{(1-L)_4}{(1-L)_0}\right)-\alpha\left[\varphi k+4K_o\right]$
Cambodia	-2.12
Indonesia	-2.34
North Korea	-2.67
South Korea	-2.02
Australia	-2.30
Malaysia	-2.24
New Zealand	-2.97
Thailand	-2.12
Philippines	-2.35
Japan	-2.16
Thailand	-2.34
China	-1.42
India	-1.49

The term in $\left(\frac{\quad}{\quad}\right)_{po}$ allows us to calculate the Compounded Annual Growth Rate (CAGR).

$$CAGR_t=\frac{U_{p4}^{1/t}}{U_{po}}-1=e^{\frac{1}{t}\ln\left(\frac{U_{p4}}{U_{po}}\right)}-1$$

Table 4. Contributions to the fall in unit price (CAGR)

Country	Unit Price (%)	Regular Investments(%)	All Contributions (%)
Cambodia	-45	-47	-49
Indonesia	-45	-43	-45
North Korea	-48	-42	-46
South Korea	-54	-47	-52
Australia	-48	-51	-50
Malaysia	-34	-36	-38
New Zealand	-48	-44	-45
Thailand	-41	-45	-44
Philippines	-46	-45	-47
Japan	-51	-54	-53
Thailand	-40	-35	-37
China	-30	-30	-30
India	-31	-34	-31

The following table provides the contributions to the fall in the unit price in CAGR:-

The results presented in Table 4 represents adjustment between unit prices and "All contributions" which is calculated as R-square. The value of R-square is found to be 0.945 which means that the model is a best fit for the countries. Also, the observations fit Equation 5 significantly. The results give a clear indication between the relation between unit prices and overall contribution of the factors.

The calculations for both static and dynamic variables were conducted and thus it is found that the contribution of static and dynamic effect were different from each other. The contribution of static effect is comparatively lower than the dynamic effects. The effects although were different for each of the countries. Countries like Australia and New Zealand experienced a decrease in operating cost by approximately 2% every year. It has been also found that these countries have a positive rate of contribution towards the investment and competitive intensity as well. The variables contributing towards the dynamic variables lead towards a switch between the options for a company. The countries have an increasing rate of competition and it corresponds towards the dynamic effects of competition on the unit prices.

The results also contribute towards the static effects which may turn up to be either positive or negative in nature. It depends on the competition intensity for each country. The factors are also dependent on the status of the country in terms of their development. Thus, it is worthwhile to note, that for a five year time frame, there are countries with increasing competition intensity and equally decreasing intensity as well. The results are similar for operating costs as well which can be seen from the results from Table 3. The fluctuations in the static effects on the increasing and decreasing unit prices contribute equally for the dynamic effects which in totality decreases the overall contribution for them. The dynamic effects have an increased percentage of effect during the 5 year window when compared to the static effects. The dynamic effects have multiplied many folds in the five year period and they tend to continue in the near future as well. The results also relate the dynamic effects with the static and dynamic effects. The elasticity of static effects remains steady with respect to time while for dynamic effects they tend to increase with time. It is for some of the special cases like perfect completion where L = 0. Hence, the increase in completion intensity cannot go beyond the perfect case. Thus, in the long run, static effect diminishes to zero while the dynamic effects increase to a substantial value. The next section covers the analysis during the long run analysis and tries to build a relation between increased margins and decrease in unit prices.

5. Analysis of Long Run Economics: Increased Margin Tends to Decrease Unit Price

The long run economics of the variables extracted for research comprises of studying the increase in margin due to decrease in unit price. To study the same, it is important to understand this relation between the two factors. Margin has a positive and an increasing impact on the unit price and simultaneously has a negative inverse effect on the investment as well. The infusion of investment brings a thrust I the traffic and indirectly contributes towards the increase in the unit prices as well. The analysis can be understood more easily by plotting the numbers of margin/user and Investment/user. The values will be different for different countries and it is important to study them carefully. The values do exist for each of the countries as distinct points and spead over a time of 5 years. The best fir line passing through all the points confirms the significant correlation of $R^2 = 0.634$. The value although is lesser than 0.7 but the BLUE indicators are confirmed with this line. It has been also found that an increased margin leads to an increase in the investment as well. Indeed, an increase in margin provides both more capabilities to Invest and, up to a certain threshold, more incentives to invest (Jeanjean, 2013[7]).

The result also witnesses an increase in investment by the countries in the telecom sector which in turn accelerates the growth of the traffic as well. Thus, the relations between the two variables are strongly and significantly positive. Unit price also falls with increase in traffic in the long run. The static effects in the long run are overpowered by the dynamic effects as it happened in the short run. This results in a situation where a further increase in margin leads to fall in the pries of unit even though there is a constantly growth in traffic caused by increased margin. Analysis of results also indicates that the relation between the static and dynamic effects on the investment patterns and traffic cannot be studied

normally. A special care needs to be taken to understand the two effects carefully and thus it needs to be discussed separately.

The result also discusses the role of competition in the margin values and thereby affecting the unit price as well. It is indicated that effect of competition behaves similarly for long run as for a short run. The competition is developed by the existence of other players in the market thereby making it a oligopoly which can never change its status to either monopoly or duopoly. Thus, the static and dynamic effects behave in a similar fashion. The static effects get feeble in some months and dynamic effects become stronger in the same time. This results in slow completion intensity which slow down the fall in unit price in the long run. It is also important to understand that these effects are uniform for telecom sector. However, for other sectors where technical progress is not high, static effects will never be out casted by the dynamic effects. As the dynamic effects are lower for other non-technical industries, it will not increase substantially thereby creating a difference between the static and dynamic effects.

Other results point out that there is a significant effect of competition and unit prices. There is a significant relationship between the two variables and therefore, competition needs to be carefully studied in future. It is known that competition tends to decrease the unit price in the telecom industry and simultaneously affects the investment and traffic as well. It is therefore proved that whether the study is conducted for a long run or a short run, it poses a similar relationship between the set of variables in the telecom industry.

6. Conclusion

The paper studies the effect of investment on various static and dynamic factors in a telecommunication industry. The technical developments in this industry make it viable to study the changes in both dynamic and static effects. The results clearly indicate that the investment is the driver of technical progress for the countries. He study is spread over a time period of 5 years and for 13 countries in the Asia Pacific region. Thr results reveal that competition avoids the growth of subscription prices as it turns the market oligopolistic. The players are free to enter and leave the competition and this helps increase in investment as well. The competition also leads to fall in prices of the services, whether it is voice calls or internet usage. The customers experience a dip in the prices of the services and tend to maintain the investment in using the telecom services. This boosts the telecom operators to enhance the quality of services without altering the price of the services. Competition also results in innovation in the services and it also leads to attraction of more customers. The theory has a small drawback as investment is driven by the level of margin. A substantial increase in the margin accelerates the fall in the prices of the telecommunication services and results in reduction in the consumer surplus. The customer who is at the end of the chain experiences a dip in the prices of the data and voice calls. Telecom industry is slowly drifting towards dealing with data rather than voice calls and this is more of a dynamic change. The investment will affect the competition and operating cost thereby making a difference in the unit price of the services. Thus, market players need to understand the static and dynamic effects of investment thereby providing the best services to their customers.

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