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Telecommunication and Its Impact over the Economic Development of SAARC Countries

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Abstract

Telecommunication is a crucial part of our modern life style and has significant influence over the growth of economy. Telecommunication is one of the most impact factors that support the promotion of business sector as well as other vital aspects of economy. In one sentence, telecommunication is the blood flow of the modern economy which intensifies the productivity level that will in return make contribution toward the various important economic factors like increasing the growth rate of GDP or GDP per capita. This paper is developed with an aim to determine the relationship between telecommunication and economic growth. To investigate this article pursues secondary data of last 41 years time horizon (1975-2015). This article implement OLS regression models where economic growth is determined in term of relevant influential variables such as teledensity, investment in telecommunication sector, revenue from telecom industry, revenue percentage of GDP, internet users. This research paper indicates that telecommunication industry might have strong and positive relationship with the economic growth.

Keyword: Telecommunication, Economic development, SAARC region, Teledensity, Internet user, Revenue in telecommunication sector, GDP per capita, Regression models.

1. Introduction: In the full swing of globalization process the world is now a global village. The advanced technology and newer innovation to develop the existing technology is the key to make it happen. The overall economic activities of financial institutions, credit market, stock market etc largely depends on the utilization of the advanced technology of communication. The continuous day to day economic activities from government to private sectors largely depends on the availability of information. Developing countries as well as in many emerging economy development of telecommunication is urged and one of the most vital factors to enhance the overall economic development and being a part of the global village. The rapid growth, development and contribution of telecommunication technology enhance the urgency of the presence of telecommunication industry in any economy as it is the technologically most advanced and important tool for sharing information as well as a base for establishing financially valuable commodity market. The telecommunication sector enhances the economic growth of a country by connecting not

only the international financial market but also the domestic financial market and commodity market. As a result telecommunication ensures the continuous flow of the additional value in the GDP in term of GDP growth or increase in the GDP per capita etc.

Kenny (2007) urged that over the last two decades the growth of telecommunication industry around the world is quite aggressive. In the emerging economy like the SAARC countries' economy the telecom industry will be able to play a significant role in the economic development by enhancing the productivity level in economic activities which in return may have influential positive impact on many macro economical factors such as increasing GDP growth rate, enhancing foreign direct investment etc. Evidenced from Ghana, Koufie et al., (2003) postulated that the presence of telecom industry creates many jobs that eventually mitigate the unemployment rate and intensify the GDP per capita. Many economists in the past periods considered the development of telecom sector as a vital factor to investigate the economical growth of a country. As a result it is a positive indication that investment in the development of telecommunication technology ultimately influences the economic growth. Noll 2007 argued that telecommunication technology offers tremendous opportunity for the developing countries where the telecom industry is not fully emerged. It is only possible because of the comparatively low investment requirement which enables these countries to take this advantage of communication where no telecommunication network is ever existed. Another part of modern telecommunication technology is internet which influences every aspects of our modern economic system. Choi, Hoon Yi in 2009 claimed that the effect of internet in the economic growth is evidenced and significant.

The main concern of this paper is to determine to what extent the telecommunication influences the economic growth of the SAARC countries. To reveal the answer this article explores 41 years' relevant data and implement OLS regression models. The results indicate the telecommunication has significant impact in the economic growth. However, sometimes it becomes more complicated when different model is considered with different dimension of macroeconomic variables. In fact the impact of telecommunication over the economic growth depends on their presence's duration and different level of the economy.

2. Literature Review: Based on the perspective of determining the significance of telecommunication on the economic development Jha and Khaleja (2008) argued that telecommunication has a crucial impact on the development of the economy. In this 21st century telecommunication is one of most pivotal factors for the development of the socio-economy of a country. The continuous improvement of the telecommunication and information technology and the effective implementation of this technology enhance and promote the growth as well as the development of the various sector of the economy such as various business services, industry, agriculture etc. Jha and Khaleja (2008) also argued that the modern telecommunication technology is an impressive gift of modern science. The infrastructure of the telecommunication is different from the other traditional infrastructure so that telecommunication has a momentous influence on the economic development than any other conventional infrastructure.

Based on the teledensity and its impact on the economy, World bank (2013) reported that as the world wide teledensity (density of telephone users) is increased by 10 percent, the world wide gross domestic product (GDP) also increased by 6 percent. In a similar study but only based on the India Young and Earnest strongly emphasized that because of the higher growth of teledensity (density of telephone users) the GDP of India is also growing faster than ever. Based on the research study conducted in the Nigeria as it is one of the most rapidly growing telecommunication markets in the world Ndudwe (2005) observed that there is an enormous growth in the number of subscribers between 2000 to 2005 from 25000 analogue mobile subscribers to 12.8 million digital mobile subscribers. During the same time line the number of fixed line (PSTN) subscribers also grew from 450, 0000 to 1.2 millions. He also argued that the numbers of overall subscribers only based on the fixed line and wireless line would be extended to 80 millions. Parker (2005) in his report highlighted that in the Sub-Saharan Africa the rapid expansion of wireless technology is minimizing the gap of telecommunication technology between them and the industrialized world. The report also demonstrated that in the Sub-Saharan Africa the total number of mobile phone subscribers is more than the number of mobile subscribers of the North America. Bays et al., (1999) investigated that the prime cause of making telephone calls is intended to economic purpose such as price of commodities business plan etc. He also found that the village where there are a higher number of telephone subscribers has low average price of the agricultural commodity than the village where the number of telephone subscriber is less. Garreau (2008) claimed that telecommunication is the technology which has the capability to reduce the poverty and enhancing the economic development. He also postulated that the growth of teledensity in the human history faster than polio vaccine.

By the conduction of Garnger-Sims causality test with a 50 years' time series data of United State of America, Beil at el., (2005) proved that there is casual relationship between telecommunication investment and economic growth. Based on another extensive study with the data of 105 countries Shiu and Lam (2007) strongly argued that telecommunication development is significantly related to the economic development. This study also revealed that there is a bidirectional causal relationship between telecommunication investment and economic development in those European countries which have a higher income level. This result indicates that both the telecommunication investment and the economic development have behavior of the independent variables to each other. Dvornik and Sobali (2007) observed that in the Eastern European country there is a casual relationship between telecommunication investment and economic development. Their study also revealed that the direction of causality is from telecommunication investment towards the GDP. Allenman et al., (2002) argued that telecommunication investment has significance influence over the economy in numbers of ways. Telecommunication investment generally reduces the production cost. Thus revenue increases which allow the firms to make reinvestment. Hence the usage of the telecommunication technology increases the productivity for all industries. Based on the empirical study conducted on the state and sub-

state level of USA by using the data from the state of Pennsylvania U.S, Cronin et al., (1993) confirm that telecommunication investment has impact on the economic activity as well as economic activity also influence the telecommunication investment. Gupta (2000) strongly emphasized on a statement that one percent growth in telecommunication service is accountable for the three percent growth of the economy. But Alleman et al., (1994) and Schwab (2005) found that as there is a significant inequality in the teledensity between developed and developing countries so that investment in the telecommunication infrastructure ensures the proper growth of economy for the developing countries. Admas and Fords (2009) Saunders et al., (1994), Madden and Savage (1998) and Loayza et al., (2004) all of them revealed that investment in the advancement of telecommunication infrastructure has positive impact on the economic growth. This results is almost similar over the world as Cronin et al., (1993), Wolde and Rufael (2007) based on USA, Yoo and Kwak (2004) based on the South Korea, Shui and Lam (2010), Madden and Savage (1998) all of them confirmed that investment in telecommunication has positive and significant contribution towards the growth of economy.

William et al., (2011) observed that revenue generated from the telecommunication services has a significant impact on the GDP in the economy of the Ghana. On the other hand Stiglitz (1998) argued that the revenue of the telecommunication industry has significant influence over the economic growth of the developing countries. From another empirical research Ovum (2006) proved that in India mobile industry has a contribution of 313 billion RS equivalent to 7.8 billion dollar towards the gross domestic product (GDP). By the conduction of a comprehensive study Mcknisey (2007) claimed that telecommunication industry particularly including the mobile operators they have a significant contribution towards the growth of the GDP which is two times larger than any other industry in China. The mobile economy GSMA technology (2015) reported that the telecommunication revenue has a greater variation based on the region to region. In developing markets such as Sub-Saharan Africa, Asia Pacific region the revenue growth is tremendous but the Europe it is slowing down only because of the subscriptions rate. They also reported that the forecasted revenue growth rate will be declined by 3.1 percent per annum until 2020. One of the main reason behind the declination is continuous competition, market maturity as well regulations. They also found even if the European region the declination of revenue rate will be stabilized but in North America the revenue declination growth is surprising due to market maturity & regulations. Badran et al., (2012) argued that in many emerging countries telecom industry is the one of most important source of revenue for national treasury. Base on an empirical study in Egypt, Saudi Arabia and India Graber and Venkata (2013) suggested that the revenue of telecommunication industry which generated from providing various services is accountable for two or three percent of total GDP.

Hudson (2000), Huff (2001), Wei and Kolko (2005), Gher and Amin (1999) Fandy (2000) all of these researchers strongly suggested that internet is the miracle tool that transform the traditional politics and commerce which eventually have a major impact

on the economic affairs in developing countries. By conducting a comprehensive study based on the 25 OCED countries with a data of 1996-2007 Czernich et al., (2009) postulated that internet and its continuous development have a positive and significant relationship with economic growth. Freund and Weinhold (2000), Choi (2003) and Goaeid (2013) argued that internet has a positive impact on the trade and foreign direct investment of an economy. By conducting a panel data analysis Choi (2005), Sassi (2013) found that internet lowers the inflation rate. Norris (2001) observed that in the western region the internet is not only used for the communication purpose but also used for the electronic commerce. The products generated from this kind of networked technology have a substantial impact on the economy in most of the developed country. World bank (2006) reported that most developed country like USA has a extension of electronic business based on internet in a larger number which is six time greater than any developing country. Zhang (2013), Bowles (2012) both of them argued that the presence of internet continuously transform the economy of Australia as the internet user was increased from 73 percent in 2007 to 87 percent in 2009. In another study based on the internet consumption model Zhang (2013) found that internet diffusion has a strong positive correlation with GDP per capita. Weinhold (2004) investigated that internet usage impulse the international trade of an economy. Frederick (2009) argued that in Ghana the growth rate of internet subscribers is potential in both private and public sector which eventually reduces paper consumption, error rate and saves money as well as time. As a result, in Ghana there are 15,000 subscribers whom has a direct internet connection and more than 5,000 users have the access to the internet through shared connection such as cyber cafe.

By considering all the arguments, discussions, previous results based on the telecommunication influences over the economic growth, it is imperative to explore the influence of telecommunication over the economy of the SAARC countries. As a result this research considered the telecommunication industry of Bangladesh, India, Pakistan, Sri lanka and Nepal as member of SAARC countries to determine the relationship between telecommunication and economic growth and demonstrate the derived results in the light of existing other research paper results, discussion and arguments.

3. Methodology: On the basis of the discussion that is demonstrated in the review of literature and to determine the answer of the prime question, the developed hypothesis as:

H1: There is significant relationship between telecommunication and economic development. Against the null hypothesis is of no relationship.

3.1 Identifying Variables:

Table 1: Variables and their respective symbols are given below:

Variables	Symbol
GDP growth rate	GGT
GDP per capita	GPC
Teledensity	TEL

Investment in telecommunication industry	INT
Revenue in telecommunication sector	RET
Internet users	INU
Telecommunication revenue percentage of GDP	REG

Through the identification all the variables lead us to the individual test of following sub- hypothesis:

H1A: There is significant relationship between teledensity and GDP growth rate.

H1B: There is significant relationship between revenue in telecommunication industry and GDP growth rate.

H1C: There is significant relationship between investment in telecommunication industry and GDP growth rate.

H1D: There is significant relationship between internet users and GDP growth rate.

H1E: There is significant relationship between telecommunication revenue percentage of GDP and GDP growth rate.

H1F: There is significant relationship between teledensity and GDP per capita.

H1G: There is significant relationship between revenue in telecommunication industry and GDP per capita.

H1H: There is significant relationship between investment in telecommunication industry and GDP per capita.

H1I: There is significant relationship between internet users and GDP per capita.

H1J: There is significant relationship between telecommunication revenue percentage of GDP and GDP per capita.

All of these hypotheses will be statistically tested to determine the findings.

3. 2 Model: GDP growth rate (GGT) and GDP per capita (GPC) both of them are used as the multiple simpler variables for economic development concept. Teledensity (TEL), Investment in telecom industry (INT), Revenue in telecommunication sector (RET), Internet users (INU), Telecommunication revenue percentage of GDP (REG) used to determine the economic development. The OLS regression model for GDP growth rate (GGT) and GDP per capita (GPC) as depended variables are following:

$$GGT_{it} = \alpha_0 + \alpha_1 TEL_{it} + \alpha_2 INT_{it} + \alpha_3 RET_{it} + \alpha_4 INU_{it} + \alpha_5 REG_{it} + \epsilon_i$$

$$GPC_{it} = \alpha_0 + \alpha_1 TEL_{it} + \alpha_2 INT_{it} + \alpha_3 RET_{it} + \alpha_4 INU_{it} + \alpha_5 REG_{it} + \epsilon_i$$

3. 3 Data and Sample: The required data for the conduction of this study is derived from the different websites, annual report of the telecommunication companies, and annual reports of the central telecommunication authority of the countries. The selected sample is 5 countries out of 8 who are the members of the SAARC for last 41 years. As a result the

numbers of observations are 205. Convenience sampling method was used to collect the sample. The collected data was analyzed and interpreted by using the E-views 8.0 statistical software.

3. 3. 1 Scope of the Study:

- This study does not consider the telecommunication and economic data from the Afghanistan, Bhutan and Maldives as their collection data was insufficient to maintain the equal number of observations for every variables.
- The scope of the study is limited to only few crucial factors (GDP growth rate, Teledensity, Revenue percentage of GDP, GDP per capita etc).

4. Findings and Analysis:

4. 1 Regression: Under the regressions model the GDP growth rate (GGT) and GDP per capita (GPC) are regressed against Teledensity (TEL), Investment in telecommunication industry (INT), Revenue in telecommunication sector (RET), Internet users (INU), Telecommunication revenue percentage of GDP (REG). Table 2 represents the output of regression models.

Table -2: Regression estimation of the various telecommunication determinants, on GDP growth rate (GGT) in model 1 and GDP per capita (GPC) in model 2.

Independent Variables	Model 1	Model 2
Constant (C)	4.599995 (0.0000)*	440.3601 (0.0000)*
Teledensity (TEL)	-1.42E-09 (0.6640)*	-4.68E-07 (0.5488)*
Investment in telecom industry (INT)	4.03E-12 (0.0447)*	-1.11E-09 (0.0201)*
Revenue in telecom industry (RET)	2.18E-12 (0.1824)*	2.00E-09 (0.0000)*
Internet user (INU)	6.48E-10 (0.9563)*	-1.19E-06 (0.6727)*
Telecommunication revenue percentage of GDP (REG)	1.30E-05 (0.0663)*	0.008203 (0.0000)*
F-Statistic	5.400431	17.28738
P-Value	0.0000	0.0000
R ²	11.9477%	30.2823%
Adjusted R ²	9.7354%	28.5306%

The P-Value is parentheses with * denoting significance level 20%.

In the first regression model the results shows us that investment in telecom industry has significant relationship with economic development. This result is consistent with prior research where positive significant relationship was established in between investment in telecommunication industry and economic development (Oladipo 2013, Kawaljeet 2014, Mohsin 2012). This results indicates investment in telecom sector evidently enhanced the economic development. The model also has R^2 and Adjusted R^2 value of 11.9477% and 9.7354%.

The regression model shows us that investment in telecom industry has significant relationship with economic development. The result also explores that revenue from telecom sectors and the revenues contribution percentage of GDP has a significant positive relationship with economic development. This result is also consistent with prior research where significant positive relation was found in between telecommunication revenue and it contribution percentage of economy with economic development (Venkata 2013, William et a., 2011). This results actually exposes that through the served services what the telecommunication industry both public and private sector has earned has promote the economy significantly in this SAARC region. This model also has R^2 and

Adjusted R^2 value of 30.2823% and 28.5306% meaning of 30.28236% of the variations of economic development can be explained by the investment in telecommunication sector, revenue in telecommunication sectors and other independent variables.

5. Conclusion: Based on the results derived from the regression analysis it is clearly evident that telecommunication has significant relationship with the economic development in SAARC countries. The positive relationship with the telecommunication and economic development indicates that higher investment in the economic development will clearly enhance the economic development. This finding also supported earlier findings where significant relationship was found. Oladipo (2013) found that investment in telecommunication enhance economic growth in Nigeria. Moreover, Andrew Hardly (1980) postulated that in the developing countries the impact of telecommunication investment is more significant. As all the members of SAARC are developing nations so that investment from telecommunication, revenue in telecom industry, percentage of telecommunication contribution toward the GDP are evidently significantly related with economic growth. As some earlier studies show that internet user has significant impact on the economic development. But the finding of this study can shed the light of the earlier results as number of internet user is not an important factors for the economic development these developing nations. One of the main reason behind is the internet penetration is very low and the penetration has become faster since only last decades in this region.

However, the telecommunication has theoretically and empirically significant relationship with the economic growth of SAARC countries. The telecommunication will also minimize the digital and economic gap between developed countries and SAARC members as it is most important and used ICT gadget in these countries.

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