

TELECOMMUNICATIONS IMPACT IN AFGHANISTAN

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Abstract. Afghanistan telecommunications rapidly expanded from almost nonexistence in 2002 to all 34 provinces throughout the country, there was a continuous rise in tele density and active mobile subscription and internet users. The industry was considered as the largest contributor to the country's GDP, and the Afghan government and foreign investors invested a huge amount in this sector, but the poverty and the unemployment rates were regularly reported high by the World Bank and other credible agencies.

In this paper, the focus will be on the impact of telecommunications in Afghanistan, especially on GDP growth, through a mixed methodology (descriptively and empirically) performing correlation and regression analysis on variables of GDP, mobile subscription, GDP per capita, and internet users from 2006 to 2020 in line with concerns in the literature review.

The results of the study show that mobile subscriptions positively influence GDP and DGP per capita, while the internet user has positive correlation but not significant impact on country GDP. However, the impact of telecommunications is broader and not limited to only economic growth. The study concludes that telecommunications strongly influence GDP and economic development, and in order to direct it toward sustainable economic growth, it requires joint efforts of government and private sector for better results from proper policy formulation and implementation.

Keywords: telecommunications, impact, GDP, telecommunications revenue, telecommunications investment, contribution, economic growth, and policy recommendations.

Introduction

This study focuses on the transformation and impact of the telecommunications industry on the GDP and economic growth in turn. Transformation and development of the telecommunications sector have been one of the biggest achievements of the Afghan government since 2002 when a new democratic government was established with the help of the International Community. Before or during the first period of Taliban rule in Afghanistan and beyond that, as a result of several decades of civil war, everything was destroyed, so violent, and there was no development in any sector, including telecommunications.

But it had very rapid growth, “According to the International Telecommunications Union (ITU) database, which includes data from official Afghan sources, mobile subscriptions increased by 700%, from 25,000 in 2002 to 200,000 in 2003. In 2020, over 22.6 million mobile subscriptions were active in the country” (Castro, 2021).

It started from zero in 2001 and reached more than 22 million active subscriptions, which shows a significant improvement in the country's history. Telecommunications evolved from nonexistence to an industry or a major contributor to the economy, attracting \$2 billion in private investments and generating a high level of revenue for the government. The services in this section cover GSM, CDMA, 3G, fixed-line, and mobile Pop coverage is 88%, and mobile penetration is 74% (Altai Consulting, 2014).

According to the Afghanistan Telecom Regulatory Authority (ATRA) in 2018, “mobile phone service is available to 90% of the population” (Noori, 2019). Not only telephony services but also the internet service are growing simultaneously. ITU states that 28% of the country's population was covered by 3G in 2013. “However, it was only from 2017 that mobile internet experienced a rapid growth: 46% in 2017, 55% in 2018, and 60% in 2019, the latest year available” (Castro, 2021).

The investment in this sector is reported to be \$ 2.1 billion (2002–2013) (Altai Consulting, 2014), which directly affecting the improvement and expansion of this industry. The development of the telecommunication sector was associated with a positive impact on Afghan society from different perspectives, including economic growth. It is one of the most significant contributors to the country's GDP. According to ICT economic impact assessment in 2013, the telecommunication sector contributed 3 times more than the rest of sectors. "For the telecommunications sector, the contribution to Afghanistan GDP is estimated to be \$707 million, nearly three times more than the rest of the industries combined (\$240 million)" (Altai Consulting, 2014).

The transformation caused telecommunications from a fragmented system serving few people to a modern one putting Afghans in touch with one another. It created remarkable job opportunities, as 7,500 direct and 100,000 indirect positions were run in this sector, which the average salary of \$600 to \$3000 (Altai Consulting, 2014).

According to the definition of World Development Indicators from revenue, telecommunication revenue comes from services such as fixed-line, mobile, and data (Atsu et al., 2014).

Afghanistan, with a GDP Growth Rate of 3%, Gross Domestic Investment of 14.1% of GDP, External Debt of 6% of GDP, External Reserves of US\$ 8,298 million, Gini Coefficient of 0.29, and a Fiscal Balance of 0.1, still suffers from extreme poverty (World Bank, 2022), and UNDP predicts 97% of the country's population will be under poverty line until mid of 2022.

In this paper, a descriptive, regression, and correlational analysis will focus on the relationship between GDP growth and telecommunication, the gaps coming from this end, and policy recommendations. Since the telecommunications industry is one of most important and most revenue-generating telecommunications industry is one of most important and most revenue-generating, the management, support, constancy, and expansion also require regulatory and policy formulation.

1. Literature review

The telecommunications industry became an important field, which generated interest among researchers. Nationally and internationally, academics have tried to conduct research and present their findings along with recommendations, but looking at studies in this field, some conclusions and results vary from context to context or from the point of interest. So, some have done research on the impact of telecommunications on economic growth, while others focused on its contribution

to GDP and so on. Atsu et al. (2014) have empirically investigated the impact of telecommunications revenue on economic growth in Ghana from 1976 to 2007, which is positive. Later in their studies, they pointed out policy implications for long and short terms. Hence they emphasized the sound environment and encouragement for massive investment in the telecommunications industry. They added that it would be more effective and useful for the government to pay attention to FDI. It is because local investors may have capital limits and technological and technical problems.

The ICT sector, which the telecommunications industry is part of, is one of the most essential and value-generating sectors. A study on this in Afghanistan says: "In the last 20 years, the ICT sector itself has become one of the most value-generating sets of activities in many countries, but the impact of ICT extends far beyond the sector itself" (Altai Consulting, 2014). Later, the study points to the impact of this sector on other sectors. "Beyond the direct contribution of ICT companies to the economy through the revenue they generate and jobs they create, the ICT sector has an impact on its related ecosystem of providers of non-ICT goods and services" (Altai Consulting, 2014). According to the study results, the sector contributes an average of \$1 billion per year to government revenues.

The results of a study in Afghanistan on the impact of ICT (telecommunications) on non-ICT sectors were observed in efficiency (time savings, coordination, monitoring, and evaluation), a decrease in operations costs, access to information (business opportunities, transparent market information, interaction with clients, e-government), anticorruption and job creation opportunities (Altai Consulting, 2014). All these contribute to productivity, effectiveness, better management of resources, and indirect contribution to economic and business development.

A study carried out by (Katz, 2009) emphasizes the importance of investment in ICT and telecommunications, which will be paid off in return as impact: "If productivity growth and employment creation are partially driven by the level of investment in ICT and telecommunications, a decrease in capital expenditures as a result of a certain regulatory framework could have an impact on the economy".

Another study on the impact of mobile telecommunications on economic development in the world and especially in developing countries, gives similar findings, saying that the diffusion of "The main findings show that mobile telecommunications significantly affects both GDP growth and productivity growth" (Gruber, 2010). But the level of impact varies in high- and low-income countries, as it has a significant effect on economic

growth in high-income countries, while it is smaller in low-income countries “While in high-income countries, the contribution of mobile telecommunications to annual GDP growth is 0.39%, for low-income countries this falls to 0.19%” (Gruber, 2010).

The policy implication is another common finding among researchers, which can positively or negatively impact the expansion of telecommunications and its contribution to economic and GDP growth. “The objectives for promoting mobile telecommunications penetration through sector liberalization policies along with appropriate regulatory frameworks are endorsed by the present study as a means for stimulating growth; however, the additional element deriving from the results is that such policies of promotion of mobile telecommunications penetration should be pursued much more forcefully, especially in cases where serious shortcomings exist” (Gruber, 2010).

“In the midst of other internal and external macroeconomic shocks, the study reveals that the percentage contribution of telecommunications to GDP, tele density, and the Consumer Price Index contribute more positively to the Nigerian economy than foreign direct investment, while manufacturing value added has a negative impact on the Nigerian economy” (Alugbuo & Eze, 2021). This finding comes again with policy recommendation to reinforce the impact of telecommunications and tele density on economic growth.

Ghafourzay and Parilti (2020), in an assessment on the impact of social media marketing on customer inspiration as part of telecommunications, presents a significant level of positivity on customer inspiration and causes business improvement and, in turn, economic development. “Böttger’s (2015) study pointed out that customer inspiration increases spending according to the motivational aspect of motivation, increasing the desire to purchase a product”, “The Impact of Social Media Marketing on Customer Inspiration and Customer Purchase Intention: A Case Study on Kabul-Afghanistan Telecom Industry” (2020).

Today, telephone or telecommunications services are integral parts of lives in the world and have rapidly grown in all countries. However, until mid -1999, the telephone was available only in urban parts of developing countries, as some African countries had as low tele density as one telephone per thousand people (Souter et al., 2005). A study focused on the impacts of the telephone in livelihood rural areas, since most people, even in less developed countries, now own telephones. It includes the usage of telephones, researching if they use it for social business expansion, protecting themselves through them, how important it is during emergencies, and overall, the impact of telephones on the life of poor

people in rural areas of target countries. Research on the use of telephony indicates significant constancy since respondents said that “telephones are important for them during emergencies, extensively used to maintain social networks, especially contact within the family, valued more for saving money than for earning money, valued more by richer and better educated people than by poorer, less educated or more marginal members of society, especially where financial value was concerned” (Souter et al., 2005). It can be linked with knowledge of using telephones somehow, as educated people can use it in broader senses than uneducated people. In the modern world, almost the majority of tasks can be handled online and it is possible to use smartphones. The impact and importance of telephony is not deniable in social and economic areas of life in all areas, including rural areas.

Another clear example of the impact of telecommunications on economic growth can come from a study on the Republic of Cameroon. According to (Katz & Jung, 2022), telecommunication revenue contributes as 3.74% to Cameroon’s GDP, which is a significant contribution. Some factors barely and positively influence the importance of telecommunications, such as dynamism in terms of sector growth and positive externalities or spillover effects. “The strong contribution of telecommunications to Cameroon’s economy is a function of two factors: (1) the dynamism in terms of the sector growth, which in turn triggers a significant number of local suppliers, distribution agents and providers of various services; and (2) the positive externalities or spillover effects, by which telecommunications networks and services result in a more efficient functioning of the economy. This drives productivity gains, innovation incentives, and better integration of isolated regions of the country, among other positive effects” (Katz & Jung, 2022).

The link between economic growth and the happiness index is also researched, and (Grainger, 2020) says that “What he found was a complex correlation between GDP growth and happiness growth. As poor countries improve their GDP, their national happiness also increases sharply. But when richer countries increase their GDP, then happiness levels are barely affected”. As Telecommunications contributes to economic growth, it can be translated into its contribution to creating happiness as well.

2. Methodology and analysis

The research in this paper follows a mixed methodology (descriptive and empirical analysis) of telecommunications impacts on Afghans’ life and its correlation with

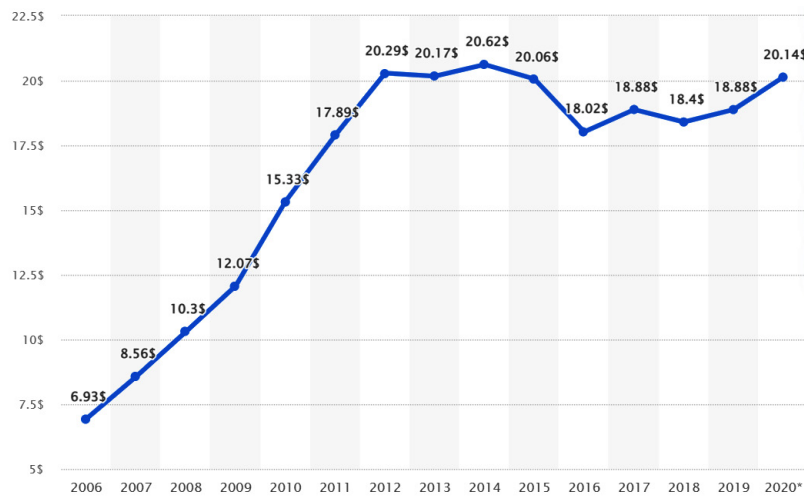


Figure 1. GDP growth from 2006 to 2020 (source: Statista, 2020)

GDP and the country’s economic growth. The World Bank in South Asia classifies Afghanistan as a low-income country. Its GDP in 2020 is reported to be around \$20.12 billion, with a GDP per capita of \$516.75. The country’s growth rate in 2020 was reported to be -2.4% (World Bank, 2022), and 49.4% of the population lived below the national poverty line with unemployment rate of 11.7% in 2020 (Asian Development Bank, 2020). Afghanistan due to 4 decades of civil war, terrorism and poverty, is a foreign aid-dependent country. After the collapse of the Islamic Republic of Afghanistan by the Taliban in 2021, the economic situation is getting worse, as a report from the World Bank says, “The report projects that the real GDP in 2022 will contract further, with an accumulated contraction of close to 30–35 percent between 2021 and 2022, before moving to a low-growth path (2.0 to 2.4%) for the next two years, with no improvement in per capita income” (World Bank, 2022).

However, another report from the World Bank shows a contraction of 20.7 of the country’s economy “The political crisis that began in August 2021 led to a significant economic contraction in Afghanistan, increasing food insecurity and widespread deprivation. Preliminary official GDP statistics show that the economy contracted by 20.7 percent in 2021” (World Bank, 2022). Since August 2021, the employment rate has decreased significantly to -61% , including -48% for men and 75% for women (World Bank, 2022).

Despite all brayers (political instability, high-level corruption and conflicts) on the way to economic development, looking at Afghanistan’s real GDP growth from 2010 to 2020, the average growth rate is calculated as 4.16% (Statista, 2020). A comparison of the country’s GDP from 2006 to 2020 shows a significant increment, as GDP in 2006 was \$6.93 billion, but in

2020 it is \$20.14 billion (Statista, 2020). The difference is \$13.21 billion, which is a huge amount of increase. The Afghanistan ICT/Telecommunications sector is one of the main contributors to the economy and GDP of the country. According to an assessment in 2013, the total revenue from the ICT sector is \$1.81 billion, and its contribution to GDP was \$950 million (Altai Consulting, 2014). The Figure 1 shows the GDP growth of Afghanistan from 2006 to 2020 (in \$ billion), which has an upward trend.

As part of ICT and telecommunications, mobile network operators (MNOs) is one of the largest contributors to the country’s GDP. According to (Altai Consulting, 2014), a total of \$5.5 billion between 2002 and 2012 revenue was generated by MNOs in Afghanistan, as Figure 2 indicates a simultaneous move of MNOs and Mobile Subscribers.

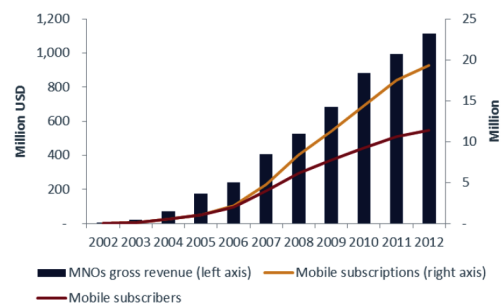


Figure 2. MNO revenue, mobile subscription, and mobile users from 2002 to 2012 (source: Altai Consulting, 2014)

Internet service providers also play a role in contributing to the country’s economy and GDP growth. Some Internet providers in 2013 were listed as Afghan Telecom, NEDA, Io Global, CereTechs, INSTA, Rana, New Dunia, and Multiunit (Altai Consulting, 2014). The

total revenue of this industry is reported \$90 million. Companies providing internet services must pay 10% of their revenue as tax to the government (Altai Consulting, 2014). In this case, 10% of \$90 million is calculated as \$9 million to be paid to the government, which is not a small amount.

Telecommunications infrastructure is another important part of the telecommunications industry that contributes to the country's economy and GDP growth. ZTE and Huawei reported the key players in 2013, Western firms: Ericsson, Alcatel-Lucent, Nokia-Siemens, Local firms working as contractors for the larger ones (Altai Consulting, 2014). Sector revenue was reported to be \$130 million in 2013, so its contribution based on 10% taxation can be \$13 million.

To perform the required tests, data on GDP, mobile subscription, GDP per capita, Internet Users, and real GDP growth rate are collected from 2006 to 2020. First, a correlation test checks the relationship between the GDP variables and Mobile Subscriptions. Below Table 1 contains a list of variables to test their variance, coefficient, and correlation.

Table 1. Table of variables

Year	GDP (\$ billion)	Mobile subscription (\$ million)	GDP per Capita per USD	Internet User (%)	The growth rate of real GDP (%)
2020	20.14	22.68	611.27	18.4	-2.35
2019	18.88	22.58	586.2	17.6	3.91
2018	18.4	21.98	582.32	16.8	1.19
2017	18.88	23.93	635.79	13.5	2.65
2016	18.02	21.6	617.13	11	2.26
2015	20.06	19.71	705.6	8.3	1.45
2014	20.62	18.41	746.92	7	2.72
2013	20.17	16.81	754.4	5.9	5.60
2012	20.29	15.34	784.61	5.5	12.75
2011	17.89	13.8	714.7	5	0.43
2010	15.33	10.22	631.49	4	14.36
2009	12.07	10.5	430.87	3.6	21.39
2008	10.3	7.9	377.26	1.8	3.93
2007	8.56	4.67	321.44	1.9	13.83
2006	6.93	2.52	270.19	2.1	5.36

In this experiment, Mobile Subscription as X variable and GDP as Y variable were tested for correlation, which below is the result (see Table 2).

The GDP and Mobile Subscription coefficient is 0.8784, which is a positive and perfect number. It shows that there is a strong correlation between them, and the effect of the X variable is positive on the Y variable, as

Table 2. GDP and Mobile Subscription correlation test result

	GDP (\$ billion)	Mobile Subscription (\$ million)
GDP (\$ billion)	1	
Mobile Subscription (\$ million)	0.8784803	1

a one-unit increment in X (Mobile Subscription) may cause a unit increment of Y(GDP).

In the second step, a regression test is also done on the same variables to check more elements on X and Y variables, which a summary is given below (see Table 3).

Table 3. Test of regression

SUMMARY OUTPUT	
Regression statistics	
Multiple R	0.8784803
R Square	0.7717276
Adjusted R Square	0.7541682
Standard Error	2.3100932
Observations	15

Based on the results of regression statistics, Multiple R, R Squared, and Adjusted R Square are all very close to +1, which is a perfect number in this range. The standard error is also small compared to the number of observations, which proves the data normality and the normal distribution of data points around the mean. In this experiment, it is hypothesized for null that there is no relationship between GDP and Mobile Subscription, and the alternative hypothesis says that there is a relationship, so a regression test is done with a 95% of confidence level with the below vitals:

Hypotheses:	H₀ = There is no relationship between GDP & Mobile Subscription H₁ = There is a relationship between GDP & Mobile Subscription
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Test:	Regression
Confidence Level:	$1 - \alpha = 95\%$ (0.95)
Thresholds:	$\alpha = 5\%$ (0.05)
	$\alpha = 0.05$ (5%)

Decision rules according to the p-value method:

p-value method:	
Reject H ₀ (null) if p value < α (0.05)	

So based on the results, the p-value is 0.0002, which is less than 0.05 or 5%, so the null hypothesis is not accepted, and the alternative hypothesis is accepted.

Table 4. Coefficients test results for GDP and Mobile Subscription

Coefficients:	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-6.0746	3.3758	-1.799	0.0952
GDP.Test\$GDP.....Billion.	1.3133	0.1981	6.629	1.64e-05 ***
Signif. codes:	0 '***'	0.001 '**'	0.01 '*'	0.05 ' ' 1
Residual standard error: 3.453 on 13 degrees of freedom				
Multiple R-squared: 0.7717				
F-statistic: 43.95 on 1 and 13 DF, p-value: 1.639e-05				
Adjusted R-squared: 0.7542				

The same result is obtained from RStudio as below (see Table 4).

The significance codes in the R output show that the p-value is quite small in a range of 0 to 0.001(1.64e-05***), which is much smaller than α value (0.05). Therefore, based on this empirical evidence, we are unable to accept null hypotheses, so we accept the alternative hypothesis.

In the second step, similarly, a test of correlation is performed between GDP and Internets users, as variables of Y and X. Below is the output Table 5.

Table 5. GDP and Internet Users correlation test results

	GDP (\$ billion)	Internet User (%)
GDP (\$ billion)	1	
Internet User (%)	0.621938	1

The result shows a positive and almost strong relationship between GDP and Internet Users with 0.621938. It means that GDP growth has a direct and positive relationship with internet users, as an increment in internet users causes an increment in GDP.

Coming to the hypotheses, the null can be a no relationship, while the alternative says a relationship. The rules can be set as follows:

Hypotheses:	H0 = There is no relationship between GDP & Internet Users H1 = There is a relationship between GDP & Internet Users
Test:	Regression
Confidence level:	$1 - \alpha = 95\%$ (0.95)
Thresholds:	$\alpha = 5\%$ (0.05)
	$\alpha = 0.05$ (5%)

Decision rules according to the p-value method says: reject H0 (null) if p value < α (0.05) and looking at the table of outputs of a regression analysis from excel in appendixes, since the p-value is much smaller in this case (0.01) than α value, which is 0.05, we cannot accept null hypotheses. To ensure this, the same test is performed in

R to compare the results so the result is exactly the same (see Table 6).

Table 6. GDP and Internet Users test using RStudio

Call: lm (formula = GDP.Test\$Internet.User... ~ GDP.Test\$GDP)					
Residuals:	Min	1Q	Median	3Q	Max
	-5.682	-3.796	-1.136	2.511	7.523
Coefficients:	Estimate	Std. Error	t value	Pr(> t)	
(Intercept)	-4.7293	4.6667	-1.013	0.3294	
GDP.Test\$GDPBillion.	0.7842	0.2739	2.864	0.0133*	
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 ' ' 1					
Residual standard error: 4.774 on 13 degrees of freedom					
Multiple R-squared: 0.3868, Adjusted R-squared: 0.3396					
F-statistic: 8.201 on 1 and 13 DF, p-value: 0.0133					

With enough empirical evidence, we can conclude that the null hypothesis is not accepted, but the alternative is accepted, so there is a relationship between the Internet user and GDP.

Now, we can check the correlation of two other variables (Mobile Subscription and GDP per Capita), and the result is as below (see Table 7).

Table 7. Mobile Subscription and GDP per Capita correlation test results

	Mobile Subscription (\$ million)	GDP per Capita per USD
Mobile Subscription (\$ million)	1	
GDP per Capita per USD	0.682874818	1

The table indicates a positive and above-average (strong) positive relationship.

A regression test is performed to check if there is a relationship between these two variables, and the

Table 8. GDP Per Capita and Mobile Subscription test of coefficients using RStudio

Call: lm (formula = GDP.Test\$GDP.per.Capita.per.USD ~ GDP.Test\$Mobile.Subscription)					
Residuals:	Min	1Q	Median	3Q	Max
	-110.87	-89.15	-74.17	123.52	202.63
Coefficients:	Estimate	Std. Error			
(Intercept)	338.114	79.746			
GDP.Test\$Mobile.Subscription....Million.	15.897	4.717			
	t value	Pr(> t)			
(Intercept)	4.24	0.000965 ***			
GDP.Test\$Mobile.Subscription....Million.	3.37	0.005021 **			
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1					
Residual standard error: 122.9 on 13 degrees of freedom					
Multiple R-squared: 0.4663, Adjusted R-squared: 0.4253					
F-statistic: 11.36 on 1 and 13 DF, p-value: 0.005021					

decision will be based on the p-value method to reject H_0 (null) if the value of $p < \alpha$ (0.05), and the result from excel and r is the same as p-value is quite small (0.005021) in both (see Table 8).

So, all results are the same, and now with a 95% confidence level and enough empirical evidence, we can say that there is a relationship between GDP per capita and mobile subscription, and the null hypothesis is not accepted.

The test result shows that the correlation between GDP per capita and Internet users is positive but not strong enough. According to the regression test in excel and R, the significance level is high as the p-value (0.21) is greater than α (0.05), so the null hypothesis cannot be rejected. The result from R is exactly the same as the excel test (see Table 9).

Having enough empirical evidence that the p-value (0.2) is greater than the α value (0.05), we cannot reject the null hypothesis, so we conclude that there is no relationship between GDP per capita and Internet Users.

Conclusions

In general. The telecommunication industry is one of the largest contributors to Afghanistan's GDP and economic growth. Telecommunications contributes some \$707 million to the GDP of the country. Looking at the growth of GDP from 2006, which is \$6.93 billion, to 2020, which is \$20.14 billion, it shows a significant difference, and mobile subscriptions followed the same growth journey, which 2.52 million, and it was 22.68 million in 2020. So, we can infer from the findings that the higher the number of mobile subscribers, the greater the contribution and the higher the GDP growth rate.

The impact of telecommunication services is not limited to economic advantages and financial boosting at the macro level, but extends to other parts of people's lives too. As telecommunication contributes to country economic development, to country economic development, so it increases the happiness index based on what (Grainger, 2020) says that economic growth in developing countries proved to increase the happiness index

Table 9. GDP per Capita and Internet Users test of coefficients using RStudio

Call: lm(formula = GDP.Test\$GDP.per.Capita.per.USD ~ GDP.Test\$Internet.User...)					
Residuals:	Min	1Q	Median	3Q	Max
	-257.885	-98.935	1.232	139.575	224.777
Coefficients:	Estimate	Std. Error	t value	Pr(> t)	
(Intercept)	508.460	71.597	7.102	8.03e-06 ***	
GDP.Test\$Internet.User...	9.341	7.203	1.297	0.217	
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1					
Adjusted R-squared: 0.04642					
Residual standard error: 158.3 on 13 degrees of freedom					
Multiple R-squared: 0.1145,					
F-statistic: 1.682 on 1 and 13 DF, p-value: 0.2173					

sharply. Since it influences health systems and programs as well, it may lead to the support of a healthy labor force, which paves the way for higher income in turn, and higher income causes a greater contribution to family income at the micro level, governments revenues at the macro level and finally impacts country economic growth positively. According to previous research, telecommunications play a key role in improving literacy levels, access to education, and family management. Telecommunications play a key role in improving literacy levels, access to education, and family management.

Coming to the business part, telecommunications improved effectiveness and efficiency, as it gives the ability to manage business remotely, cuts or decreases costs, saves time, and increases the security and safety of human beings using it for or during emergencies. The findings from studies on the impact of telecommunication usage indicate that telecommunications positively influenced livelihoods, contributed to business opportunities (job creation), helped transparent market information, advanced interaction with clients, and facilitated e-government (to fight against corruption).

In addition to descriptive analysis, empirical test results also show a positive and strong correlation between GDP and Mobile Subscription, GDP per capita and Mobile Subscription, and GDP and Internet Users. However, the impact of Internet Users on GDP is not considered significant according to weak correlations and regression test results. As this positive and strong correlation between GDP and Mobile Subscription, GDP per capita and Mobile Subscription can be translated in direct contribution to the country's economic growth and development, so it requires government regulations and policy to remain supportive for further expansion and improvement in the telecommunications sector in Afghanistan, especially in remote areas, where people don't have access to telecommunication services.

After taking control of Afghanistan in 2021 by the Taliban, there might be new trends and challenges to identify these emerging trends. Barriers to increasing the effective use of telecom services as a cross-cutting sector in all other sectors, and since girls' education has faced a severe problem in the country under Taliban rule, so the role of telecommunication is key in digital and online studies support and innovation; therefore, further researches can explore more on those trends, barriers and on how the sector can help the girls to have access to education.

Limitations (On the way of the research)

It is mentionable that, having access to data linked with Afghanistan from credible sources is quite difficult. Due to volatile context of the country, insecurity and

criminal activities, majority of the firms/companies are not interested in sharing and publicity of their sensitive information, including financial statements, profit accumulation and number of staff. As 2021 was the date that Afghanistan government collapsed to the hand of Taliban, so it was very complicated and the data for this year was fully influenced by new changes and not accessible either; so to make a sound analysis, 2021 was excluded from the analysis.

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TELEKOMUNIKACIJŲ POVEIKIS AFGANISTANE

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Santrauka. Pasaulio bankas ir kitos patikimų šaltinių agentūros reguliariai praneša apie aukštą skurdo ir nedarbo lygį. Šiame straipsnyje daugiausia dėmesio bus skiriama telekomunikacijų Afganistane poveikiui, ypač BVP augimui bei jų plėtrai. Taikant mišrią metodiką (aprašomąją ir empirinę), atliekant BVP, mobiliojo ryšio abonentų, BVP vienam gyventojui ir interneto vartotojų kintamųjų koreliacijos ir regresijos analizę 2006–2020 m. bei atsižvelgiant į literatūros apžvalgoje pateiktus susirūpinimą keliančius klausimus, bus nagrinėjamas telekomunikacijų poveikis Afganistane.

Tyrimo rezultatai rodo, kad mobiliojo ryšio abonentai daro teigiamą įtaką BVP vienam gyventojui, o interneto vartotojas turi teigiamą koreliaciją, bet ne reikšmingą poveikį šalies BVP. Tačiau telekomunikacijų poveikis yra platesnis ir neapsiriboja tik ekonomikos augimu. Tyrime daroma išvada, kad telekomunikacijos daro didelę įtaką BVP ir ekonomikos plėtrai, o norint ją nukreipti tvarios ekonomikos augimo link reikia bendrų vyriausybės ir privačiojo sektoriaus pastangų, kad būtų pasiekti geresni tinkamo politikos formavimo ir įgyvendinimo rezultatai.

Reikšminiai žodžiai: telekomunikacijos, poveikis, BVP, investicijos į telekomunikacijas.

APPENDIX

Mobile Subscription and GDP (Mobile Subscription ~GDP) test in excel:

ANOVA								
	df	SS	MS	F	Significance F			
Regression	1	234.537862	234.537862	43.94950185	1.64E-05			
Residual	13	69.37489796	5.336530613					
Total	14	303.91276						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	7.3216083	1.49864643	4.88548076	0.000297696	4.08398	10.55924	4.08398	10.55924
Mobile Subscription (\$ Million)	0.58764614	0.088641871	6.629442047	1.63913E-05	0.396147	0.779145	0.396147	0.779145

Table of GDP and Internet Users:

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.621938							
R Square	0.386807							
Adjusted R Square	0.339639							
Standard Error	3.78618							
Observations	15							
ANOVA								
	df	SS	MS	F	Significance F			
Regression	1	117.5556673	117.55567	8.2005125	0.0133041			

	df	SS	MS	F	Significance F			
Residual	13	186.3570927	14.335161					
Total	14	303.91276						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	12.41114	1.712044953	7.24931	6.464E-06	8.7124964	16.109793	8.71249637	16.109793
Internet User (%)	0.493242	0.172242223	2.8636537	0.0133041	0.1211354	0.8653488	0.12113538	0.8653488

Mobile Subscription and GDP per capita:

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.682874818							
R Square	0.466318017							
Adjusted R Square	0.425265556							
Standard Error	122.9245865							
Observations	15							
ANOVA								
	df	SS	MS	F	Significance F			
Regression	1	171640.7952	171640.8	11.35908	0.005021			
Residual	13	196435.9015	15110.45					
Total	14	368076.6967						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	338.1143115	79.74591344	4.239895	0.000965	165.8337	510.3949	165.8337	510.3949
Mobile Subscription (\$ Million)	15.89716453	4.716807649	3.370323	0.005021	5.707121	26.08721	5.707121	26.08721

Internet Users and GDP per Capita:

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.338428625							
R Square	0.114533934							
Adjusted R Square	0.04642116							
Standard Error	158.337377							
Observations	15							
ANOVA								
	df	SS	MS	F	Significance F			
Regression	1	42157.27224	42157.27	1.681534	0.217266			
Residual	13	325919.4245	25070.72					
Total	14	368076.6967						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	508.4600704	71.59741175	7.101654	8.03E-06	353.7833	663.1369	353.7833	663.1369
Internet User (%)	9.340595949	7.203138759	1.29674	0.217266	-6.22084	24.90203	-6.22084	24.90203