Infrastructure Development (Physical, Non-Physical), Economic Growth and Policy Choices: A Cross Country Analysis.

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<u>CERTIFICATE</u>

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Abstract

This following study inspects the influence of the physical and non-physical infrastructure on economic growth of Asian countries. Countries from where data is selected for examination are China, India, Bangladesh, Iran and Sri Lanka. The data of last 50 years have been regressed from 1970 to 2019. The findings explain that there is substantial relationship between infrastructure development and economic growth; infrastructure reflects both physical and non-physical. Energy consumption (oil) and other variables proved positively significant relationship with economic growth. Policy has been recommended for economic growth and approach to value the variables according to needs and financial constraints and then prioritize the sectors in which government should invest.

Chapter 1

Introduction

There is a heated debate regarding the relationship between the economic growth verses infrastructure development and its policy implications. Multipurpose studies regarding these issues were conducted since the late 90's. The role of infrastructure is very much important in economic growth over long run. There are two types of infrastructure defined by the researchers Physical Infrastructure and Non-Physical Infrastructure.

The studies on physical infrastructure relationship has been conducted by (Aschauer, 1989; Lau & Sin, 1997; Lynde & Richmond, 2019; McGuire, 1990; Ratner, 1983). They have attempted to capture the relationship between public infrastructure capitals and the total factor productivity of the US economy and established that there is a positive effect of public infrastructure capital growth on the economy of US and the effect was highly significant and positive.

Likewise, numerous such studies have been conducted in China regarding this subject. China had executed very high infrastructure(physical) investment policy for economic growth (Démurger, 2001; Nannan & Jianing, 2012; Sahoo, 2010; Wang, 2002) their studies show the highly significant relationship transpires between infrastructure (physical) development and economic growth. The last two decades of the Pakistan economy has shown a little bit of boom. The last 5 years the economic policies were infrastructure intensive, due to that the GDP has raised and also a high raise in infrastructure development in the country with remittances boost in early 2000. The economy had seen investment in infrastructure development through connection of roads and mainly CPEC.

1.0 Research Problem:

Infrastructure investment in Pakistan is more diverted towards physical infrastructure i.e. roads and highways and tangible infrastructure projects and less forced on non-physical infrastructure i.e. education and health sector. According of previous studies the impact of investment on non-physical infrastructure is more than that of physical infrastructure with long lasting impact. In the light of this the research problem of studies will look into the factors which are more inclined towards investment in non-physical rather than physical infrastructure. So, this have been further operationalized into following research objectives.

1.1 Research Questions:

The previous studies demonstrated the a rather positive relation between the public investment in infrastructure and economic growth. In the light of this there are following research questions.

- Which segment of infrastructure plays major part in the economic growth, either its physical or non-physical infrastructure?
- Can infrastructure development be used as a tool to maintain or raise the economic growth in long run?

1.2 Research Design:

Direction, technique and research design depends upon the types of inquiry in qualitative, quantitative and mix-method approach (Creswell, 2014). This research is directed towards

quantitative methods to look at the elements of infrastructure development, economic growth and policy choices by analyzing the indicators in physical and non-physical infrastructure. Researcher has selected descriptive research design for this research because data required for this research is external, secondary taken from World Bank statistics. As this research is based on quantitative research methods with descriptive design; data has been produced and results have been described in tabular form. Data and result have been produced in order to meet the objective of research.

1.3 Research Strategy:

Creswell examined an inquiry into social and human issues demanding of testing and speculation or hypothesis made out of factors, estimated with numbers and broke down with measurable strategies. In the direction of this researcher used quantitative research strategy because it involves, he measures of tangible and countable features with the help of available statistical data.

1.4 Research Significance:

According to the studies there is a significant role of physical infrastructure in economic development. The biggest example of that is China where there is huge government spending in infrastructure development. The studies of China shows that the economic growth can effect by infrastructure development. (Démurger, 2001; Nannan & Jianing, 2012). The paper published by (Nannan & Jianing, 2012) shows that the non-physical side has its own share when it comes to have an effect on economic growth. The paper has established that non-physical side of infrastructure has more effect on economic growth than that of physical side. (Canning & Pedroni, 2004; Fedderke, Perkins, & Luiz, 2006; Nannan & Jianing, 2012) these studies show that infrastructure development (physical) effects the economic growth in long run.

My study will guide regarding the policies that may help achieve infrastructural development in future in Pakistan in particular, which segment should be given more weightage when it comes for government to spend for development or how should government focus the physical and non-physical infrastructure development.

Chapter 2

Literature Review

The observed research on effect and the role infrastructure plays in economic growth started after the foundational work by (Aschauer, 1989) where Aschauer reasoned that public spending is reasonably productive, and the decrease in the U.S productivity was in direct relevance to decline in the public infrastructure. Moreover (McGuire, 1990) established high output elasticity of public infrastructure investment on economic productivity although it happened to be somewhat lower than that of (Aschauer). (Aschauer, 1989) has assessed the relation between the infrastructure stock and growth in USA that mainly compromises of physical infrastructure that include roads and highways, gas and electricity and mass transport systems that can be elaborated as fundamental infrastructure stock. (Lau & Sin, 1997) has conducted study in USA to interpret the previously found positive relationship. (Fedderke et al., 2006) scrutinized the relationship of infrastructure investment by the government and output growth, by analyzing the data set of 88 countries the variable he opted was stock of infrastructure. The time series selected was from 1960 to 2000. PMG (pooled mean group) was employed for the estimation of the data

. They found that estimates are statistically significant and an also stout to alternate infrastructure measures and dynamic specifications.

While in Asia (Straub & Terada-Hagiwara, 2011) this paper explained the overview of infrastructure development in context of developing Asian countries. This paper applies two discrete approaches that are growth regressions and accounting of growth to investigate the linkage between productivity of an economy and economic growth and infrastructure. The infrastructure development is important for the households as it provides final consumption services to it and

items of production for intermediate consumption. Infrastructure also plays a crucial role for provision of growth and decline in poverty. From the supply side, there are two ways of effects the direct and indirect channel. The direct channel deals with infrastructure capital stock which is also regarded as a production factor in the paper. There is direct impact of infrastructure stock on the productivity of the other factors. The other channel that is the indirect one, that deals with the technological improvement and its effects on infrastructure progress. Both the sides could operate through different channels, like increase in labor productivity results in better information and communication technologies. Which then decreases the time wasted on commuting to work and stress. Also it creates better education and health facilities and systematic economies of scale. From the demand side, people are provided with services they need and are necessities like water and sanitation, power for daily use, communications apparatus and transport. The unavailability of necessities that are mentioned above take the discussion towards the poverty. Increasing in level of stock of infrastructure, has direct interpretation for reduction in poverty. The article determines that the infrastructure stocks have been growing at an ample pace in developing Asia countries. Despite of all the significant findings showed in the paper the levels of infrastructure stock remain well below if we compare that to the world in terms of quality and quantity. There is positive impact on the economic growth due to the accretion of infrastructure stock as a massive buildup of the infrastructure stock is desirable, but it is possible that it may be beyond the financial reach of some of the governments.

The paper portrayed a cross country approximations, which shows that for the most number of infrastructure indicators the growth rate of infrastructure stock has a positively significant impact on GDP per capita in the subgroups of EAP and SA countries. On the other hand growth accounting exercise shows results in a few countries that are positive and significant effects of infrastructure

on TFP growth, the countries are PRC, the Republic of Korea, and Thailand. (Egert, Kozluk, & Sutherland, 2009) the paper found that infrastructure has enhanced the economic growth in OECD countries through economies of scale, network externalities and enhancement in market competition. They found a strong and positive impact of efficient investment in telecom and power sector in long run economic growth across the countries. Despite that the transportation sector effects are not included in these positive effects are not extending to transportation sector. (Sahoo & Dash, 2009) India is regarded as developing economy with the biggest middle class that attracts more of the word multi-national companies and foreign investors. The mention paper shows the impact of infrastructure investment in context of Indian economy. The data for the investigation was of 25 years form 1970 till 2006. The variables taken into account were infrastructure stock, labor force and total investment in infrastructure. The results shows high significance between the variables and economic growth. (Pillai, 2008) Kerala is regarded as well-established state in terms of social infrastructure and physical infrastructure. The mentioned papers show the effect of infrastructure development on economic growth as well as on the human development under the umbrella of invisible hand theory. The variables under discussion are mainly physical infrastructure related with in context of their effect on the human development index that are calculated domestically. The method use for estimation is Markov Chain Causality. The studies show the significant effect, yet it thrives for quasi-freedom for better economic growth. With that the study estimated the index for every variable for the infrastructure development. The paper established that with economic growth the infrastructure development also positively effects the human development. (Abbas & Choudhury, 2013) electricity consumption is used as proxy for infrastructure broadly. This paper discusses the effect of electricity consumption on agricultural GDP of India. The paper discusses both long run and short effect of electricity consumption on

agricultural GDP. Mostly the agricultural sector depends on the old ways of taking water for agriculture usage and also the electric appliance used in agriculture are owed by landlords thus the policy regarding that is supply enhancement strategy. (Nihas, Barlish, & Kashiwagi, n.d.) Construction industry plays an important role in economic growth. But the inefficiencies and the time lapses hurt the economy in terms of over cost. (Mishra & Mishra, n.d.) Education and health are the major point of discussion in the paper. The estimation time period taken was from 1995 till 2015. Toda-Yomamoto causality test was used for estimation. There has been high rating global index in years of 2003-04 and 2010-11. The results show that there is unidirectional effect of education on the spending with that there is also education and health have significant effect on the economic growth. The point to ponder is that the investment in education also create expansion in the health expenditure. The investment in education leads to the well trained and well-equipped labor force that leads to economic growth. With that keeping in mind the health sector also effect the labor force in a way that the productivity doesn't get effected so that leads to more work hence increase in the economic growth. (Pravesh, n.d.) The paper discussed the previous results and tried to redefine the linkage between the education expenditure and economic growth in the Indian economy. The time series data has been taken of 28 years i.e from 1980 till 2008 for the estimation purpose, econometric modeling has been used. The long-run results show that there is a significant relation present between the education expenditure of government and economic growth. But the ECM technique showed that the impact of the education expenditure per labor has a lesser effect on the economic growth than that of the physical capital per labor. The results depicted that there is 0.28% increase in the GDP of India with an increase of 1% in physical labor per labor. On the other hand there is o.11% increase in the GDP with an increase in 1% in government expenditure on the education per labor. (Saiful Islam, Abdul Wadud Qamarullah Bin Tariq Islam, Abdul

Wadud, & Bin Tariq Islam, n.d.) if we discussing about Asian countries we cannot ignore the Bangladesh. As it has the greater GDP among the SARC nation. The citied paper examined the casual relationship between the education and GDP (income). Multivariate approach has been used for estimation of the data that has been chosen from 1976-2003. The paper discussed that there is three forms of relationship between education and income. First is that increase in income can cause increase in education that means increase in GDP is directly proportional to the positive change in the education spending. The second form is that both education and income help each other to grow. According to the paper Bangladesh is currently going to the second form of relationship. Both education and income is helping each other to grow. The third form is education can cause growth in income. The results shows the bidirectional causality between the GDP and education that contradicts from the previous findings on the matter those findings are mostly unidirectional causalities. (Sahoo & Dash, 2012) in this paper examined the infrastructure elasticity of four South Asian Countries Pakistan, India, Bangladesh and Sri Lanka. The index of infrastructure stock was developed in the studies for the investigation of the effect caused by infrastructure on the output. With that the paper has used panel co-integration strategy on for the time period of 25 years i.e 1980 – 2005. The studies portrayed the long-run significant relationship between the output and infrastructure along with other variables like labor force, human capital, international trade and gross domestic capital formation that is denoted as GDCF. The results show the significant positive relation among the variable. With that there is infrastructure development cause significant change in the total output of the south Asian economies as per studies. Furthermore, panel causality analysis shows the mutual feedback relation between the total output and infrastructure development. The countries under the investigation are more have in common than any other country in Asia. Every one of them were colonies of Britain and the ties between

them are horrible from the start leading to multiple wars between the countries. Each of them are developing nation and highly relay on foreign borrowings for spending with that the poverty and GDPs are also low comparing to other countries. The paper show the way towards the future policy making to enhance the growth by expanding the expenditure into infrastructure side rather than defense side. (Maitra & Mukhopadhyay, n.d.) the role of public spending on the gross domestic product has been capture over last two decades of a dozen countries in Asia and the Pacific. In the six countries including Bangladesh showed the co-integration between the variables. The remaining six countries including Sri Lanka showed it otherwise. The results showed that there is positive and significant effect of education spending on the GDP of the countries except Philippines. While Maldives, Vanuatu and Kiribati showed the negative impact of health spending on the gross domestic product. While Malaysia and RPK showed stagnant response to both education and health spending on the GDP. Sri Lanka went through Gorilla war and inner rebel damaged the economy. The results showed that inn short run there is negative impact of education spending on the GDP but after 5 lags the impact turned positive. On other hand the health spending showed positive result at 2 and 6 lags. That induce that the constant expenditure in both the sectors will give the optimal results, but the condition is the government has to keep spending. Bangladesh shows positive relationship on both educational and health sector spending. The result showed the significant positive relation in both short and long-run. That means the significant health and education spending will shape the future GDP of the country. Mortality also effect the economic growth . (J. Zhang, Zhang, & Lee, 2001) the paper captured the result of mortality in terms of fertility and what will be the effect of that on the child education investment. There are child policies in China, which helped contain the population of China. The paper showed that there was positive relationship between the mortality decline and economic growth in such a way that

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mortality decline effect the investment of parents on a child more that help the economy in the future thus cause the economic growth. (Islam, 2014) the paper shows the Bangladesh health system heavily relay on government spending for health facilities supply and financing for health sector infrastructure. Health sector receive a little attention from the total resources of Bangladesh economy that means a lot of stubborn issues relating health sector. Only 3% of total GDP of Bangladesh is invested in health sector (WHO). In that investment 34% is financed by the government and 66% from foreign debts that cause inequity. That causes a serious issue in health sector. The assessment of data that is secondary, the paper tried to capture the health issues in the Bangladeshi economy. The result shows that there is high complexity in the health sector of Bangladesh and inefficient labor force. Also, the political instability and inefficient allocation of funds to health sector damaged the health sector. Bangladesh economy has showing positive impact towards achieving MGD4 and MGD5, the health related MDGs. The private sector is growing on small territorial levels providing basic health services. Bangladesh after showing that much progress still lack a descriptive policy regarding primary health sector. The challenges faced by the Bangladesh economy is the lack of leadership and political stability. Only the strong leadership can bring upon the change in the health system and health investment. The policies and the framework that will work more efficiently for the betterment of health and betterment in health facilities for the Bangladeshi population. Likewise, in Iran the studies shows the impact of infrastructure on the economic growth. (Review, Sojoodi, Zonuzi, Mehin, & Nia, 2012) The drawback in infrastructure amount in Iran, that became a major issue in less economic growth in developing low income country like Iran. In recent years. There is a raise in infrastructure investment in Iran afterwards. The paper captures the effect of from 1985 to 2008 of infrastructure on economic growth of Iran. ARDL framework has been used for estimation. Infrastructure capital

is used as input function into aggregate production function. The findings of the paper portray that the increase in infrastructure that is road and highways and railways, have a positively significant relationship with economic growth. also, the telecommunication infrastructure has positive effect on Iranian economy. But there is no significant impact of electricity production capacity on economic growth in Iran.

China's economic growth is basically infrastructure lead growth. Their policies are infrastructure intensive from past decade. (Wang, 2002) attempted to propose a framework of production for evaluating the interrelation between extension of public infrastructure and private production growth and identifying the externalities effecting both the variables. The production framework consists of two sorts of the two-sector dynamic model. Both the sectors cause an effect known as spillover effect on one another. Growth equations are regressed for 7 of the East Asian economies for 20 years' time period i.e 1979–1998. The estimation results points that both the hypothesis regarding spillover effects cannot be rejected. The effect of private production sector on public infrastructure sector is relatively greater. This means maintaining the balance between infrastructure extension and private sector growth is vital for speedy economic development. The important question that raises is how efficiently did the government manages the existing infrastructure stock .(Nannan & Jianing, 2012) the article examines the impact of infrastructure stocks on economic growth, the results shows that both the physical and non-physical infrastructure effect positively the economic growth. The amount by which they non-physical infrastructure effect the economic growth is high as compared to that of the physical infrastructure. The paper uses the cob duglus production function for the estimation. The results shows the comparison among the variables physical and non-physical infrastructure. The comparison is on the basis of return to scale. Which according to paper non-physical side has more return to scale

in comparison with physical infrastructure. That means there is tradeoff between physical and non-physical infrastructure when a government has to imply a policy on government expenditure. On the other side (Devarajan, Swaroop, & Zou, 1996) has distinguished between the productivity and non-productivity public expenditures. The data set off 20 years was taken of 43 developing countries. The results show that there is positive relationship between the economic growth and current expenditure in the selected countries that have been selected. Thus that makes the result significant in the case, but if the expenditure in capital component of economy are increased in excess that decreases the effect of the government expenditure on the economic growth. That implies that the government are spending on capital expenditures rather than current expenditures that are hurting the economic growth. (X. P. Zhang & Cheng, 2009) the mentioned paper interprets the results showing the direction and existence of Granger causality between carbon emission, energy consumption and economic growth. Multivariate technique has been used to estimate the date of 47 years i.e from 1960-2007. The variables taken into consideration are carbon emission, economic growth, energy consumption and capital and urban population. Unidirectional Granger causality has been detected in the long run. That means the government can use conservative policy regarding energy usage and that also won't hurt the economic growth in the long run. The results showed that in long rum both carbon emission and energy consumption showed any positive change in the economic growth of the country. That paved the way for the future policy making regarding the energy usage of the country in the long run. The fossil fuels are a big no for the future and also for the present. That demands the technological changes and also shifting from fossil fuels to the renewable energy like wind, water etc. also the medium- and long-term projects to make it happen. With that nuclear energy can be used for energy consumption. (Démurger, 2001) this paper shows the relationship of transportation and telecommunication infrastructure on the

economic growth of the 24 Chinese provinces excluding the municipalities. The result shows that there is positive relation of transportation and telecommunication sector and economic growth. But there are disparities among the provinces on account of geographic situation, reforms and openness. Also the variance in transportation infrastructure elaborate the gap between the economic growths of the different provinces and also point out the role of the telecommunication infrastructure in order to diminish the disparity among the provinces. (Ding & Knight, 2009) Last three decades the annual growth rate of China was 9%. To capture the remarkable growth of china. Paper attempts to illuminate the growth by choosing panel data on 146 countries over the time period of 24 years i.e from 1980-2004. To examine the rapid growth of China and amount of gap between the growth rate of China and other countries. Solow model was used to explain the findings. By using GMM estimation technique and restrictive assumptions intact. The Solow model explained the cause of variation in the economic growth is human capital and structural changes. China's higher success in economic growth is due to high physical and capital investment, conditional convergence gains, conclusive changes employment structure and total output and low population growth. The paper gives us a clear picture of how policy should be made in terms of maintaining and also increasing the economic growth by investing in the infrastructure. As the paper was able to capture the 88% of the growth caused by the income level, investment rates and the growth in the human capital through the estimation they used. Also, the efficient accumulation of capital and low population growth rate and importantly the education. That created a huge difference between the China and 148 other countries. (Sahoo, 2010) For the last few decades China has been the fastest growing developing economy in the world. the prominent distinction of China's growth has been its highly investment-led policies and the growth caused by that. Development of physical infrastructure is why China has sustained high economic growth and

increased competitiveness in manufacturing market globally. That's why the paper tried to come up with answers about the role of infrastructure in encouraging economic growth in China for the time period 1975 to 2007. The results show the effect of infrastructure, labour force, public and private investments on economic growth in China. Infrastructure development in China has significantly positive effect on growth beside both private and public investment. Also there is unidirectional causality of infrastructure development on the output growth that justify the high spending of China in infrastructure development and also the bi-directional causality between the output and infrastructure investment. The paper showed that China has maintained its growth with increasing the growth level by investing in human capital and infrastructure. But not only are that the designs of economic policies crucial for that matter. (F. Huang, Jin, & Sun, 2009) This study checks the long- and short-term relation of higher education on the economic growth of china. The tool for investigation that used is cointegration method. The variables chosen for estimation are enrolment of higher education and actual GDP data per capita in China, the time spawn used is from 1972 to 2007. it is discovered from the empirical result that there is first order integration present in the log sequences of enrolment of higher education and actual GDP. There is positive and significant long-term co-integration relationship present between enrolment of higher education and actual GDP of China. With an adjustment rate of 7% that is denoted as λ, that means the will be pulled back towards the equilibrium in the long term. When fluctuation occurs of enrolment in higher education from the long-run equilibrium. Based on the results it is proved that one percent change has a positive impact of higher education scale can lead to positive impact on actual GDP per capita. Actual GDP per capita can also impact positively to the scale of higher education within a short period of time. But it may detain the effect in the long run. That means increase in enrolment in higher education increase the GDP per capita, but also in long term it will

increase the and maintain the GDP. (Zheng, Li, Song, & Yu, 2013) Spatial panel techniques is used to examine elements of allocation of infrastructure investment on regional made by the Chinese government. Sample is that is used was of 31 Chinese provinces over the time frame of 2001-2008. There were four major findings in the paper. Firstly, there is substantial spatial relations of Chinese government expenditures in infrastructure across different regions. Secondly the infrastructure investment shows a highly positive effect on the economic growth. Thirdly the Chinese government attempted to balance efficiency and equity among the regions with the help of its decision-making and lastly the political factor, that also plays an important role in the regional infrastructure investment. The result induced that if a region gets high level of investment from the central government that means the adjacent region will also get the same level of infrastructure investment from the government. Also, the equity means the weightage approach when it comes to allocating the funds to different regions. That means there is less efficiency in terms of economic growth among the regions if there is a huge gap between the infrastructure investments. So, a through policy is required that will favourable for the less developed regions. A contradiction to the previous studies there is negative impact of debit financed infrastructural growth on economic growth. After seeing three long decades of infrastructure boom now Chinese economy is showing a decreasing trend. So, the questions arise. Is purposeful infrastructure investment the cause behind the economic growth of China? Can China be a benchmark for the other leading democracies how to invest in infrastructure? The economic literature already presents about economic growth and the policies made from that literature. The high economic growth is due to infrastructure investment that's what the predecessor literatures show. China has made itself a benchmark for all the word. According to the paper what Chinese politicians made infrastructurally in China, the politicians of democracy can't envy that. The estimation is based on

a larger data set seemingly one of its kind. The paper put holes in the two prevailing myths. First, economic growth is created by infrastructure. Second, China is efficient in its infrastructure delivery. Infrastructure development is far from a toeing force for the economic growth. importantly typical infrastructure investment lacks the ability for the return it should adjust in the long run. Moreover, in comparison with leading democracies China's record is not that better in relevance to infrastructure development. There is initial boom in GDP when there is construction going on, when government spending is largely on unproductive projects. Bust of that bubble follows the sudden arbitrage growth. after a downfall in forecasting then these unproductive projects. There government investments are financed by foreign debts. Main cause of debit burden increasing are these unproductive projects, then that leads to monetary expansion in debits, financial markets instability and economic fragility. That's what the Chinese economy is facing as of now. In conclusion the paper suggested main reason behind financial problems and economic surfacing is inefficient provisioning of government spending on unproductive projects. The predictions according to the results are that china should get rid unproductive projects and shifts toward high return oriented infrastructural projects. Also, China should change its infrastructure policy if not there will be infrastructure lead economic growth downfall. Which most likely would be a crisis. According to the paper the model currently is been followed by China is highly discourage able for the other nations for following. (Ansar, Flyvbjerg, Budzier, & Lunn, 2016)

While in Pakistan a few studies have been made regarding this issues. (Siddiqui, 2004) checked the effects of availability and consumption energy that includes electricity natural gas and oil on the economic growth for the economy of Pakistan. The study came up with the results that the growing energy prices and ever rising gap between demand and supply of energy resources is a

major barrier in the way of economic growth of Pakistan. Among all energy resources, impact of petroleum and electricity is crucial for economic growth of Pakistan. Pakistan is a developing country with having natural gas in abundance but also the major part of electricity is been produced by the water resources. Most importantly there is a low in petroleum sector as we have to import the petroleum final products for consumption purpose. So as the results there is positive relationship between electricity consumption and economic growth and also the natural gas consumption on economic growth but there is positive relation between oil consumption and economic growth with reverse causality. (Looney, 1997) the paper focuses on the way by which private sector investment can be louvered for the expansion in different sectors of infrastructural facilities, and to check if there is any long-run equilibrium between private investment, infrastructure and GDP. The major findings of the paper suggested the role of infrastructure in the model is not as straightforward as might appears. On one level of the model it appears that in the case of Pakistan the expansion in public infrastructure has played inactive role in the economic development of the country. The public facilities have largely provided by the government spending in response to the needs that are created by private sector investment in manufacturing sector rather than that of creating private capital formation. There is another perspective that infrastructure has shown responsiveness to physical needs created by private sector expansion, it has been very effective in alleviating real bottlenecks in the different sectors. The paper also elaborates the investment in the infrastructure is showing highly significant effect on the economic growth but that is clearly in the short run time period or current situation. But the Pakistan economy has a very little maneuvering capability in long terms to maintain and to maximize the utilization of the infrastructure available. Pakistan majorly finance the infrastructure spending through borrowings form IMF and WB. That means it will hurt the economy if the infrastructure spending

is not channelized and prioritize properly. (Ahmed, Abbas, & Ahmed, 2018) this paper has used a dynamic EGC model to descriptively elaborate the outcomes of investment in physical infrastructure in Pakistan. They analyzed the consequences of taxes and foreign borrowing for infrastructure investment at micro and macro level. They found the positive outcome in both the cases of public physical investments in Pakistan economy. In addition to that they found that in the long-run formation of public infrastructure creates dramatic reductions in poverty levels along with other gains at macro level. As mentioned before Pakistan highly relay on borrowings for the infrastructure investment. In the both sides of the financing show the positive effect on the economic growth of the country. In short run there is draw back in case of taxes as it will increase the burden on the local industry thus resulting in the downfall in the economic growth, but also the dutch-disease effect on the exports can be captured in case of foreign borrowings. The results shows slight increase in economic growth both in short and long run in favor of foreign borrowings than that of taxes, that doesn't mean borrowing for financing is favorable the utilization of the taxes and borrowing are crucial for getting the maximum results. (Shoukat, 2017) he has used PCM and Johansen's con-integration method for long run analysis of physical infrastructure on economic growth. Paper has shown the positive relation between the variables and economic growth. The mentioned paper also describes the value institutional and organizational values and process in the maximization of the effect on economic growth. But the paper also point out the lack of information and values on organizational and institutional level. That may cause the decrease in the effect cause by the infrastructure investment on the economic growth. (Aqeel & Sabihuddin Butt, 2001) This paper captures the effect of energy consumption on economic growth and employment in Pakistan. The estimation technique that has been used are co-integration and Hsiao's version of Granger causality. The results show that economic growth is been caused by

energy consumption and that also leads to increase in consumption of petroleum. On the other side there is no effect of natural gas consumption on economic growth. Opposite to that in the power sector there is a positive relationship between electricity consumption and economic growth. The finding of the paper suggests that energy conservation policy regarding petroleum consumption that means using Natural Gas where it's possible in space of petroleum won't have any side-effects on economic growth in Pakistan. Energy policy should compromise of electrical and natural gas consumption keeping out the petroleum from the picture and use the natural gas as the substitute for petroleum consumption. According to the paper in the 90's more than 90% of the total share of petroleum consumption is to be imported. That means low balance of payments and also price increase in the domestic production circle that hits the economic growth negatively. So substituting the Gas with petroleum is essential in context of Pakistan. (Economics, 2017) according to the paper the physical infrastructure stock in Pakistan is increasing in the last two decades but in a low peace. For getting a broader picture about the physical infrastructure stock and its effect on economic growth and total factor of production the investigation has been conducted. Two amylases have been done; first analysis showed the effect of different indicators on total factor of production. Second analysis showed the effect on economic growth of physical infrastructure stock that contain electricity, telecommunication, water irrigation and roads & highways. The analysis illuminated the effect of physical infrastructure stock on both TFP and economic growth. According to the paper the government is forcing the investment in the physical but mostly on the roads and highways, no doubt the results of that are positively significant. But the effect of that on the GDP is low as compared to electricity and water irrigation infrastructure stock. For significant and long-term development and economic growth large sum of investment is required in the physical infrastructure stock that includes road highways, electricity, telecommunication and water

infrastructure. These all sectors are part of Public sector development program, but the result shows that for higher return government should prioritize the electricity and water infrastructure to have comparable more effect on the economic growth. As the urbanization is increasing that means the resources would have to be used more thoughtfully, more depletion in forest less spaces and higher energy consumption every thig leads to the prioritization of government spending in PSDP rather that doing it politically. (Sharif Chaudhry, of Economics, Zakariya University Multan, Safdar, & Farooq, 2012) The study investigates the effect of energy consumption on economic growth of Pakistan. The study is based on data of 20 years i.e. 1972-2012. In global world the demand for energy is increasing on daily basis. Most of the countries are facing shortage in energy sector and that is hurting their economies in larger scales. There isn't enough investment in energy sector in Pakistan in context with battling the rising usage and consumption of energy consumption. There are shortcomings from both demand and supply side of the energy sector. Circular debit is also a huge hurdle in achieving desired economic growth in context of Pakistan. Among the other sources of energy, the electricity has the most significant and much more effect on economic growth in comparison with oil and gas energy. On other hand, the effect of oil consumption on economic growth is adverse. That is because of its high import cost and the import volume. Trade openness is also an important indicator for economic growth, as shown in the studies it has positive effect on economic growth in Pakistan. Policy implication according to study are, that government should convert from oil import to the local energy sources that are gas and coal. That will help Pakistan contain current account deficit and more economic growth. The second suggestion is to revise the energy prices, the prices should be decreased for domestic and commercial usage. (M. K. Khan, Teng, & Khan, 2019) the basic emphasis of the study is on the environmental degradation caused by the energy consumption. The energy under fire are coal, gas

and oil energy consumption. The paper shows highly significant relation between the energy consumption and economic growth. The research model that is used is ARDL simulation. The results showed that there is positive relation between energy consumption and economic growth. Also, the energy consumption has positive effect on environment degradation both in short and long-run. The physical infrastructure has indeed a significant effect on the economic growth as proven by the studies mention. Let's discuss the other side of the infrastructure to have a broad view of the impact both cause on economic growth.

 (Ali, Chaudhry, & Farooq, 2012) the investigated the effect of human capital formation on economic growth. Education Enrolment, head count ratio, infant mortality and CPI inflation, fixed capital formation and investment growth rate were taken for analysis. The study showed the positive impact of the mention variables with economic growth of Pakistan except head count ratio and investment growth rate. The result shows the positive effect of education enrolment in long term on economic growth. Here head count ratio is used as proxy for poverty and education enrolment s proxy of human capital. (Afzal, Rehman, Farooq, & Sarwar, 2011) Co-integration and causality has been studied in this paper between economic growth in Pakistan and education in thorough manner. The date used for estimation was depending on real gross domestic product, education, physical capital and labour force. Data was selected from 1970 till 2006. Autoregressive Distributed Lag (ARDL) Model of Co-integration and the Augmented Granger Causality Approach has been used. The result showed co-integration between education and economic growth. The study also suggested the responsiveness of education with economic growth at every educational level. Higher education caused the highest level of impact on the economic growth among the levels of education. With physical capital labour force was also found a key indicator to capture the effect of education on economic growth. The study suggested that the government

spending on higher education should be increased that is universities, so that the economic growth can be increased in a swift manner. With that investment in overall education sector is also desirable. (M. O. Chaudhry, Faridi, Farooq, & Arif, 2013) The impact of health sector investment on economic growth has been studied in the paper. Being part of developing countries slow economic growth is hurting the economy. That means miserable health services due to less economic growth. the estimation capture the effect of factor related health on the economic growth. The secondary data source has been used for estimation. ARDL technique has been used to estimate the economic growth. The variable used are employed labor force, exchange rate, inflation rate, FCF, total number of beds in hospitals, health expenditures, total number of dispensaries and total number of registered doctors. The variables showed positive relation except the exchange rate. The study depicts that the better investment in health sector create better health facilities that contributes more to the economic growth. So increasing in health spending was advised for government. (Hassan & Kalim, 2012) This study captures triangular causality among the real GDP per capita, per capita education expenditures and per capita health expenditures in long run in Pakistan. Ng - Perron test is used to check stationarity. ARDL bounds testing approach is used for long run relationship testing. Granger Causality test is used for short-run testing. Data is selected from 1972 – 2009 for the estimation. Paper showed a significant relationship in the long run among the GDP, health expenditures and educational expenditures in the Country. In short run, Bidirectional effect is been captured between GDP and education expenditures. Whereas, granger causality isn't present between education expenditure and GDP in short run. In long run there is granger causality between the variables. The study establishes that there is combined causality among the GDP, health expenditure and education expenditure, both in short and long term in Pakistan. (Afridi, 2016) Human capital can be defined as a set of resources held by a human

like education, health, productivity, skills and other abilities. Collectively these abilities form a good human being and a good citizen that will help at large in development and growth of the economy. There is a drop in ranking of Pakistan in terms of human capital index from 109 to 113 out of 124 countries. That requires a lot of attention from the policy makers and concerned authorities of Pakistan. The main reason of estimation is to find the relationship between human capital and economic growth in Pakistan. The estimation confirms the effect of human capital on economic development in Pakistan. Result shows that the health and the education sector require more investment from the government and needs a proper policy making weightage for the betterment of the sectors and the economy.

The previous studies produced worldwide or in context of Asia, China (whose economy is mainly physical infrastructure lead economy) and most importantly in Pakistan the results showed that there is a significant relationship between the economic growth and infrastructural development mainly physical infrastructure. There are less amount of research work done regarding non-physical infrastructure or a comparison or which is more important physical infrastructure or non-physical infrastructure. If you go through the previous literature available worldwide or mainly in this particular studies you will find very less literature about the specifically non-infrastructural development and its significance or wither government should emphasize its policies more towards non-physical infra-structure or weighted approach should be used while making the infrastructural policies where government should invest more of its resources, knowing what should there approach bear them in return.

 In context of Pakistan there is no such study that compromises of the comparison between which should we choose and why would we choose that side of infrastructure. In china a study is made

what should we choose physical or non-physical infrastructure (Nannan & Jianing, 2012). I am looking forward to doing study on this topic to calculate which side is more favorable according to our economic conditions.

2.0 Research Gap:

The literature above gives a thorough image of studies that are conducted in different parts of the globe regarding infrastructure development and economic growth. From developed economies to the developing economies. The literature mainly comprises of Physical infrastructure development and its effect whether its long run or short run. There is not much debate whether there physical or non-physical infrastructure should be a priority for a government while making policies. What weightage should be giving according to the effect it's having on a particular economy.

The research gap that has identified is that there isn't enough research present that has shown that either infrastructure investment/development can be used as a tool to maintain or increase the rate of economic development and also which side of infrastructure either physical or nonphysical infrastructure should be used in a long run for better economic growth.

Chapter 3

Model, Data and Methodology

3.1 Theoretical Framework:

Infrastructure can be divided into two physical and non-physical; there are studies that show the effects and impacts of different variables from physical and non-physical infrastructure having significant effect on economic growth. Non-physical side consist of the variables like school's enrollment, health, mortality rate etc. (Maitra & Mukhopadhyay, n.d.) Paper shows the results of 12 Asian countries including Sri Lanka and Bangladesh according to their income level that the public spending on health education has significant impact on economic growth. (Afzal et al., 2011) this paper specifically illuminates the effect of education on economic growth of Pakistan. Different education levels have been selected and ARLD was used (Journal, 2000) . The higher education level has the most impact on economic growth than other education, with education Labor force and Physical Capital were also has a significant relationship. (Assistant, 2011) this papers capture the long run effect of government spending on education having significant effect on GDP , that 1% increase in government spending on education per labor can lead to 0.11% increase in GDP. (*scholar*, n.d.) Chinese economy is an infrastructure lead economy and shows that there is a significant relation between government spending on health, education and GDP. (Munnell, 1992) (Maitra & Mukhopadhyay, n.d.; *scholar*, n.d.) (Erçelİk, 2018) these papers show the significant relationship between health expenditure and economic growth in Asian countries (low and middle income) and also in Turkey. (Mishra & Mishra, n.d.)(Elmi & Sadeghi, 2012) these paper shows the impact of health expenditure on economies of India and Iran respectively,

in Iran the health expenditure impacts more in long-run as compare to short-run. (Hassan & Kalim, 2012) shows the significance of expenditure on health on economic growth both in short and long-run in case of Pakistan. (Kalemli-Ozcan, 2002; Kalemli-Ozcan, Ryder, & Weil, 2000; J. Zhang et al., 2001) shows mortality and economic growth has a bit complicated relationship that depends on many other related factors, these papers shows the there is significant relationship between mortality and economic growth. Education sector has a significant role in economic development of a country the different variables can be used to depict the different impacts and the significance of education spending on economic growth. Physical infrastructure has a significant role in economic growth as defined by (Button, 1998). Physical infrastructure can be further examined by different variables. (Economics, 2017; Pillai, 2008; Sahoo & Dash, 2012; Shoukat, 2017) these papers show the significance of physical infrastructure in economic growth in different economies including Pakistan's. Electricity production and consumption is a crucial part of an economy. Electricity consumption is regarded as key variable to see the effect of infrastructure development on economic growth; the electricity consumption has a significant impact both in short and long-run on economic growth. (I. S. Chaudhry & Safdar, 2012; Egert et al., 2009; Kusharjanto & Kim, 2011; Muhammad & Wasif, 2012; Shahbaz & Feridun, 2012; Ullah, 2013)(Abbas & Choudhury, 2013). Oil consumption is also used as a proxy of physical infrastructure; it has significant positive impact on the economic growth in Asian economies. Construction Industry has a big share in Asian economies, constructions is highly significant impact on economic growth. (I. S. Chaudhry & Safdar, 2012) (Aqeel, 2001)(B. Huang, Hwang, & Yang, 2007).

3.2 Hypothesis:

3.2.1 Hypothesis 1:

$H°$= both the physical and non-physical infrastructure cause significant growth. Physical infrastructure doesn't cause significantly more growth than that of non-physical infrastructure does.

H^1= both the physical and non-physical infrastructure cause significant growth. Physical infrastructure causes significantly more growth than non-physical infrastructure does.

3.2.2 Hypothesis 2:

$H°$ = There is significant relationship between physical infrastructure and other variables defined in study.

H^1 = No significant relationship between physical infrastructure and other variables defined in study.

3.2.2 Hypothesis 3:

$H°$ = There is significant relationship between nonphysical infrastructure and other variables defined in study.

H^1 = No significant relationship between nonphysical infrastructure and other variables defined in study.

3.3 Definition and Construction of Variables

 3.3.1 Regressors

These are explanatory variables and they help in explaining the relationship given by regression equation for e.g. levels of education into primary and secondary and infrastructure divided into physical and non- physical.

3.3.2 Construction of variables

Constructs used for scientific research must have precise and clear definitions. Researcher has used a simple construct of variable for instance education is referred as primary and secondary although there are other dimensions of education but to make clear construction of variable only two categories has been taken similarly infrastructure is also constructed as physical and non-physical.

3.4 **Data and Data Sources**:

The data will be used is panel data of last 50 years and 6 countries Pakistan, India, China, Bangladesh, Iran and Sri Lanka. The data source is World Bank.

3.5 Econometric Model:

ARDL model was introduced by Pesaran et al. (2001) in order to incorporate I(0) and I(1) variables in same estimation. The autoregressive model is used for decades to model the economic relationships between economic variables in a single equation. ARDL approach is used for forecasting and to disentangle long run relationship from short run dynamics. Its popularity stems from the fact that co-integration of non-stationary is equivalent to error correction process also there is no need to determine the order of integration amongst the variable in advance. The

researcher has used ARDL approach because of time series data and the data has auto regressive nature and value of all variables is determined by its past values and some adjustment factors. ARDL is also used to find out the long-term relationship between variables i.e. between physical, nonphysical, and economic growth. In addition, it is statistically much more significant approach for the determination of co-integration relationship in small samples while allowing different optimal lag of variables.
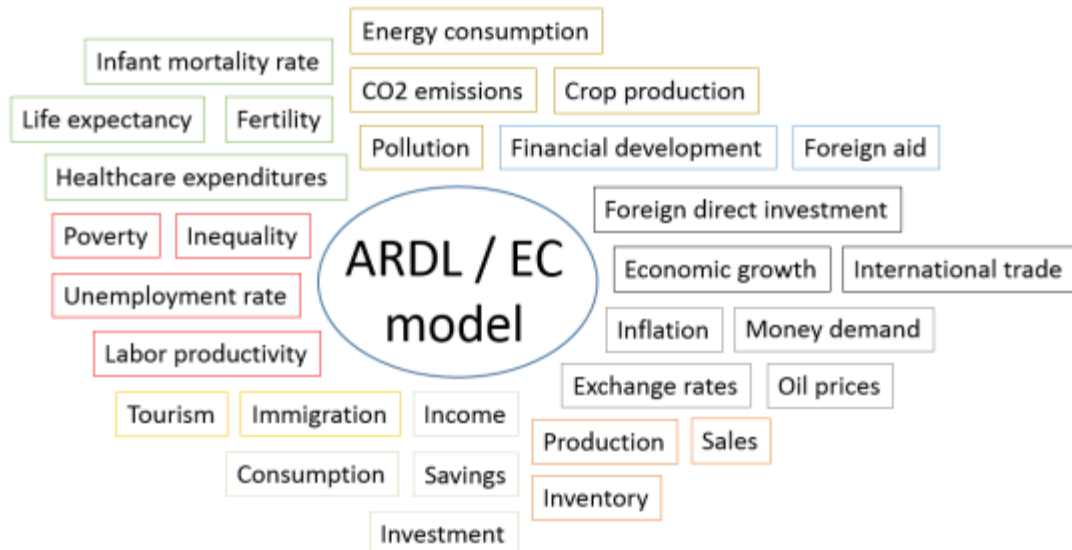
The model for the estimation is ARLD Model. ARLD was used by (Y.Shin, M. Hashem, n.d.) (Richard J. Smith, n.d.) (Z. Khan, Rabbi, Ahmad, & Siqun, 2019).

$$\Delta Y_{GDP(it)} = \alpha_1 Mot_{it} + a_2 Beds_{it} + \alpha_3 Phys_{it} + \alpha_4 School(P)_{it} + \alpha_5 School(S)_{it} + \alpha_6 Eclectric_{it} + \alpha_7 Energy_{it} + \alpha_6 Industy_{it} + \mu_{it} \quad \textbf{(Eq. 1)}$$

It's a Log-Linear model as the values of GDP Per Capita changed to log values to change it to percentage values. The independent variables are Mortality as Mot, Beds as Beds Per Hospital

Per (1000), Physicians (Per 1000) as Phys School Enrollment (Primary) Gross% as School(P), School Enrollment (Secondary) Gross% as School (S), Electricity Consumption Kwh Per Capita as Electric, Energy Consumption (Oil Kgs) , Per Capita as Energy and Industry (construction) Value Added % GDP as Industry. Whereas (i) is cross section and (t) is time from 1970-2019. $\lambda_1, \lambda_2, \lambda_3, \lambda_4, \lambda_5$ and λ_6 are coefficient and μ_{it} is the error term.

$$\Delta Y_{GDP(it)} = \lambda Mot_{it} + \lambda_2 Beds_{it} + \lambda_3 Phys_{it} + \lambda_4 School(P)_{it} + \lambda_5 School(S)_{it} +$$

$$\lambda_6 Eclectric_{it} + \lambda_7 Energy_{it} + \lambda_6 \mathbf{Industy}_{it} + \mu_{it} \qquad \textbf{(Eq. 2)}$$

CHAPTER 4

Results and Interpretation:

Unit Root Test:

Table 1.0:

Results of Panel Unit Root Tests		
	Levin-Lin-Chu (2002) (LLC)	
Variables	I(0)	I(1)
GDP	0.64672 (0.741)	8.44175 (0.000)
Mortality	-0.71905 (0.2361)	-1.793 (0.428)
Beds per hospital	-1.64734 (0.0497)	-14.0748 (0.000)
Physicians	0.06721 (0.5268)	-9.34557 (0.000)
School enrollment (Primary)	-1.76905 (0.0384)	-8.09466 (0.000)
School enrolment (secondary)	0.50954 (0.6948)	-3.8801 (0.00001)
Electricity Consumption	-1.36109 (0.0867)	-0.10686 (0.000)
Energy Consumption (oil)	-0.39282 (0.3584)	-0.10686 (0.4574)
Industry (Construction)	0.93371 (0.8248)	-0.10686 (0.000)

The results of Table 1.0 illuminate that the variables are integrated at *I*(1). The results support us to use ARDL Bound Test approach for cointegration.

Table 1.1

Long Run Equation				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*

Electricity Consumption (kwh)	0.001454	0.000468	3.10485	0.0022
Energy Consumption (Oil Kg)	-0.00132	0.000549	-2.404559	0.0172
Hospital Beds Per 1000	-0.728308	0.268222	-2.715315	0.0073
Industry(Construction)	0.087863	0.022017	3.990662	0.0001
Mortality	0.004659	0.001533	3.038937	0.0027
Physicians	0.10085	0.036449	2.766879	0.0063
School Enrollment (Primary)	0.016039	0.007665	2.092606	0.0378
School Enrollment (Secondary)	0.034064	0.010482	3.249924	0.0014

Table 1.1 shows the results for the long run. The variables are significant, 1 % change in electricity consumption changes GDP by 0.0014 %, as the developing economies are mostly reliant on industrial and services sector for the growth these sectors highly dependent of electricity consumption the positive relation that means higher the consumption higher the GDP. (Siddiqui, 2004). 1% increase in Energy Consumption (Oil) decreases GDP by 0.00132 % as oil is being imported for the domestic usage also for industrial usage that has impact on balance of payments that in broad terms effects the GDP inversely. Same results have been shown by (M. K. Khan et al., 2019; Sharif Chaudhry et al., 2012). 1% increase in Industry (construction) impacts the GDP 0.08%, construction industry is an integral part of economic growth and also it is related to other sectors of economy too as construction provide much employment and also it mobilize the private sector as well that also play important part in economic growth (Durdyev & Ismail, 2012) (Farooqui, Ahmed, & Lodi, 2008). 1% change in Mortality changes the GDP by 0.004 % as the Mortality is decreasing variable, due to health expenditures and also the research advancements in the medicine and treatments the mortality rate is decreasing in adults that's a booster for the labor power and onwards to the economic growth and productivity. 1% change in Physicians changes the GDP by 0.1008%, physicians work for the economic growth in two ways first, the act as rent

seekers that means more the number of physicians more benefit for the economic activity and also more number of physicians means less time of labor force out of work during illness that means less productivity loss so that has direct effect on GDP (Reilly, 2012). 1 % change in School Enrollment (Primary) and School Enrollment (Secondary) effect the GDP 0.016 & 0.031% respectively, increase in school enrollment directly affect the GDP the higher the level of education higher the effect as explained before by the (Afzal et al., 2011). Lastly Beds per Hospital, 1% change in beds per hospital decreases the GDP 0.72 %, as a matter of fact the government spending's on health is stagnant that means ever low number of beds available according to the population increase in the country, also the government hospitals are overcrowded and private hospitals are unaffordable by the public. As developing country, the most population is either middle class or lower middle that means low affordability of private health services and that means overcrowding in government provided facilities leading to unproductivity.

Table 1.2

Short Run Equation				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
∧	-0.097585	0.037756	-2.584657	0.0105
D(GDP(-1))	-0.044608	0.114935	-0.388116	0.6984
D(ELECTRIC(-1))	-0.004981	0.004832	-1.030835	0.304
D(ENERGYOIL(-1))	-0.002775	0.002965	-0.935938	0.3506
D(HOSPITAL(-1))	0.169236	0.083559	2.025351	0.0443
D(INDUSTRY(-1))	-0.06275	0.063979	-0.980789	0.328
D(MORTALITY(-1))	0.010116	0.009106	1.110955	0.2681

D(PHYSICIANS(-1))	1.320096	1.272394	1.03749	0.3009
D(SCHOOLP(-1))	-0.001722	0.002282	-0.754502	0.4515
D(SCHOOLS(-1))	-0.004351	0.003335	-1.304458	0.1938
C	0.321247	0.160305	2.003968	0.0466

Mean dependent var	0.111017	S.D. dependent var	1.064845
S.E. of regression	1.257494	Akaike info criterion	-1.431262
Sum squared resid	281.47	Schwarz criterion	0.074943
Log likelihood	336.6893	Hannan-Quinn criter.	-0.828477

Table 1.2 reports the short run findings, major portion of variables show insignificant relationship with the GDP, school enrollment (primary & secondary), physicians, mortality, industry (construction), electricity consumption and energy consumption (oil). The significant variable beds per hospital. λ denotes the speed of adjustment towards the equilibrium or the convergence towards the long-run equilibrium, at every year 9.7% adjustment takes place. Most of the variables shows the negative impact on economic growth, in long-run these variables showed the positive impact on the economic growth. That means sudden boom in the education, health and physical infrastructure don't show any positive impact on economic growth. But in long-term these investments bear the fruit of economic growth. That means government shouldn't stop investment in education, health, construction industry and energy infrastructure sector.

Chapter 4

Conclusion and Policy Recommendations:

4.0 Conclusion:

Infrastructure development plays crucial role in economic growth, whether its physical infrastructure or non-physical infrastructure. The results show the significance of both sides of infrastructure. Both the physical and non-physical variables have positive and significant effect on economic growth in long run except Energy Consumption (oil) and Beds per hospital. Which somehow contradict with the existing studies (M. O. Chaudhry et al., 2013), specifically Beds per Hospital. The health expenditure is stagnant for past decade that means there is not enough investment in the health sector which made the results show negative relation between the variable and the economic growth. Other variable does show the significance and the movement towards the long run equilibrium.

Education sector shows the level wise greater impact on the economic growth previously showed by (Afzal et al., 2011). That means education has high response effect towards the government expenditure. Electricity consumption has positive response towards the economic growth, as in previous years there was significant government spending in the electricity projects. Those spending have shown the results. That shows the importance of energy sector spending in Pakistan. While Energy Consumption (oil) has negative impact on the economy. That is to obvious as larger portion of the oil must be imported from the international market and government buy it on deferred payments that also leads to increase in foreign debts and the current account deficit. So

rather than using imported oil we should move towards the local energy sources. hospital beds show negative effect on economic growth that is arguably opposing the previous findings, in context with population increase in Pakistan the beds per hospital are not up to the mark for significant health facilities. So, there is a lot of policy changing required in health department. The physicians showed the higher impact on growth, as it contains both the health side and the educational side. More physicians mean less time for labor force out of work and basic health services available at the nearest point. from educational point of view that means more research towards cures and health related techniques. Likewise, in China, the growth is infrastructure lead, according to studies yearly 1500 km roads are added to road infrastructure. If you see the most recent infrastructural development you can see the efficiency on institutional level in infrastructural development, the hospital development in China was remarkable they have took only days to establish the hospital for the corona cure and many other cure centers. If we can see that example as a benchmark for the Chinese economy and their intuitional values. After the revolution in 1949, the china changed their constitution and move towards communism. The government started investments in infrastructural development. China heavily invested in roads and highways infrastructure with that also in energy sector. In accordance to the study if we see the results, there is similarities and the results shows the significance of the selected variables on the economic growth. China is also leading the way in word production and capturing the international markets and the under develop countries through the infrastructure investment in the developing countries. The infrastructure development has elevated the Chinese economy in the Asian region and the most fast-growing developing country. The industry is growing fast that means good travelling infrastructure. Less inefficiency in movability that means flourishing industrial sector. In accordance to that the investment in energy sector is pretty vast in Chinese

economy. The industrial development in China has taken world by a storm. Everything is now produced in China, from ships to a needle. The china is now shifting its investments worldwide. CPEC is merely a project in the projects China is leading in developing nation in the world right now. With projects in Bangladesh, Sri Lanka and African nations. The China is distributing the investments and earning the profits and exploring new markets for greater economic growth. Likewise, in India after having three wars against Pakistan and the destructions and budget deficit faced by both the nations. India moved its concern towards the middle class. the date set stats from 1970, the post war year. After that there is increasing trend in the data set. That means there is growth trend in the economy. That shows the economic growth. There is significant investment in infrastructure in India. India is a growing market in the world. As it contains the larger middle class in Asia and the world. The investment in infrastructure and the in-education infrastructure has grown greatly. the main example for the educational growth is that all the CEO's around the world in leading software industries are Indians. Also, the multi-national are investing in huge amount in Indian economy. That means high investment in infrastructure. Also, Indian policy according multi-national companies are that you have to share the technology after a decade of the plantation of the industry. India is leading in car industry. Whereas in Pakistan we don't have one car producing domestic company with international recognition. With having highest share of middle class, India has larger share of poverty-stricken population. They need a lot investment in health infrastructure like we do. In contrast to that there is a lot of Indian physicians capturing the international physician's market. According to estimations and results show the positive impact of infrastructure in the Indian economy. Indian economy is also a big importer of petroleum products. That hurts their economy. Also, the fighting between the neighbors has hurt the economies of sub-continent nations. That drags a lot of budget towards defense that consumes a lot of share from

health and education sectors. Hence, India should reconsider its policies to ensure better health infrastructure for its people. As of Bangladesh, the country has been through many ups and downs. From the very start country is been through much loss in political manner. After the separation the government started from the scrap in the Bangladesh. There was political instability and a lot of Indian invasion regarding policy making. The study shows the positive impact of the variables on the economic growth. The industrial sector boom really helped the economy. But Bangladesh is still facing the political insecurities regarding the future. That is hurting the economy. The Bangladesh has the most poverty-stricken population and the rate of urban migration is raising. That means a lot of infrastructure development is required for a better economic growth likewise for the employment generation ultimately leading to economic growth.

4.1 Limitation Of Studies:

1) Availability of data was difficult specially Hospital Per Bed was missing for some years.

2) Work can be done on more variables related to physical and non-physical variables: Telecommunication infrastructure, roads and highways, railways, infant mortality, women mortality, health expenditure etc.

4.1 Collective Policy Recommendations for Developing Economies (India, Pakistan, China, Iran, Bangladesh and Srilanka):

- The variables regarding health have mix effect on economic growth of developing economies; The mortality is decreasing on yearly base but the stagnant spending on

hospital infrastructure is having negative effect on the economies which demands a drastic changes in policy by increasing the spending on hospital infrastructure through public-private partnership in health sector.

- The physical infrastructure, electricity consumption is regarded as a defining variable for economic growth; it's a necessity for domestic and commercial sector of the economy. Long term investment in electricity infrastructure is beneficial both in economic growth it will help in increasing the development of construction industry and economy.

- Economy of developing economies (India, Pakistan, China, Iran, Bangladesh and Srilanka) is heavily oil reliant with no real foreign exchange and not having the technological advancement to process the crude oil for future consumption purpose. and cause inflation in the country. The governments of above-mentioned developing economies need to make a concerted effort to diversify its energy reliance on solar, hydro, and clean coal.

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