China-Pakistan Economic Corridor (CPEC): An Evaluation Study of Eastern and Western Routes.

M. Phil Thesis

Submitted by: Shahbaz Ali

Supervised by: Dr. Khurrum S. Mughal

The School of Public Policy

Pakistan Institute of Development Economics
Islamabad, Pakistan

Address: Quaid-i-Azam University Campus, Islamabad 44000
Phone: (051) 9248051

Pakistan Institute of Development Economics, Islamabad

PIDE School of Public Policy

CERTIFICATE

This is to certify that this thesis entitled: **"China-Pakistan Economic Corridor (CPEC): An Evaluation study of Eastern and Western Routes"** submitted by Mr. Shahbaz Ali is accepted in its present form by the School of Public Policy, Pakistan Institute of Development Economics (PIDE), Islamabad as satisfying the requirements for partial fulfillment of the degree in Master of Philosophy in Public Policy.

Supervisor:

Dr. Khurrum S. Mughal
Assistant Professor,
COMSATS Institute of Information Technology,
Islamabad.

External Examiner:

Dr. Sajid Amin Javed,
Research Fellow,
Sustainable Development Policy Institute (SDPI),
Islamabad.

Head,
PIDE School of Public Policy:

Dr. Iftikhar Ahmad
Assistant Professor,
Pakistan Institute of Development Economics,
Islamabad.

Acronyms

CPEC	China-Pakistan Economic Corridor
SEZs	Special Economic Zones
SEC	Southern Economic Corridor
GMS	Greater Mekong Sub-region
FDI	Foreign Direct Investment
SSD	Special Security Division
PSLM	Pakistan Social and Living Standards Survey
MCDM	Multiple Criteria Decision Making Technique
VFT	Value Focused Thinking Technique
MACBETH	Measuring Attractiveness by a Categorical Based Evaluation Technique
APCs	All Parties Conferences
KPK	Khyber Pakhtunkhwa

Table of Content

Abstract

China-Pakistan Economic Corridor (CPEC) is being unanimously taken as a window of opportunity in Pakistan But, the routes of CPEC became a debatable topic that which route would be more beneficial for the country. The objective of this study is to find the optimal route of CPEC by comparing eastern route and western routes on a comprehensive framework based on multiple criteria. This decision making framework has been generated from the potential objectives, targets and factors of CPEC. By using secondary data, Multiple Criteria Decision-Making (MCDM) technique has been applied to evaluated the two routes of CPEC. Western route got higher score than eastern route by 0.11 points in aggregate result and it is also better than eastern routes in 25 out of total 38 criteria of the framework. So, Western route is more preferable than eastern route for the construction. Thus the policy implication is that the government of Pakistan tries to focus more on western route than eastern route because it would be more beneficial for Pakistan in term of socio-economic development not only in present but in future too.

Keywords: CPEC, MCDM, Multiple Criteria framework, Evaluation,

Chapter 1

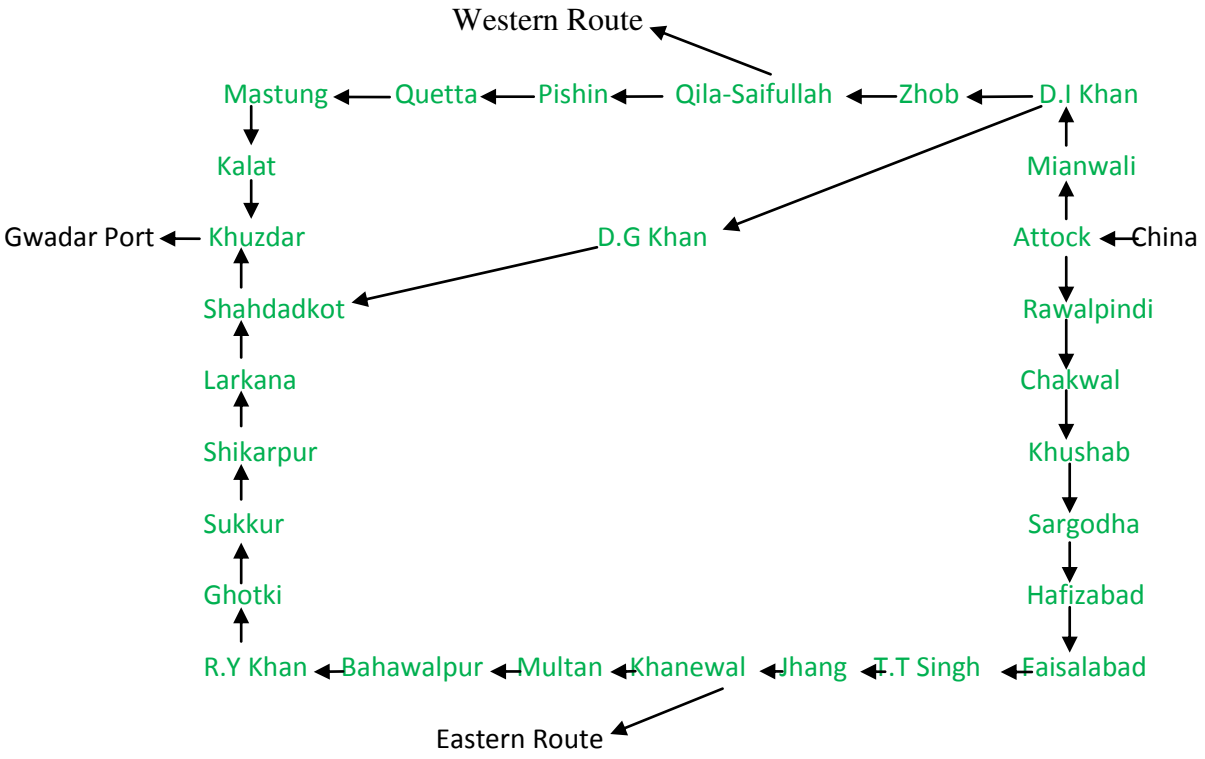
Introduction

In 2013, China revealed its vision of "One Belt, One Road" (OBOR) which consists of two parts "Silk Road Economic Belt" and "21st Century Maritime Silk Road". China-Pakistan Economic Corridor (CPEC) is a flagship project of China's "One Belt, One Road" (OBOR) program and consists of many projects of Economic Development, Transportation, Infrastructure and etc. On July 5, 2013, the Prime Minister Nawaz Sharif visited China and signed several memorandums of understanding (MoUs) on many projects in various sectors like as Energy (Iqbal, 2016). Later, when the Chinese President Xi Jinping came to Pakistan in April, 2015, these initial agreements became the portfolio of investment by China in Pakistan (Zimmerman, 2015).

China-Pakistan Economic Corridor comprises of two sub-corridors: first of them is the economic corridor that mainly consists of investment in four sectors Energy, Infrastructure, Gwadar city/Port and Industrialization. Second of them is transit corridor that consists of road networking and the transportation from the Gwadar Port to rest of Pakistan and other regional countries like China and Central Asian states. CPEC is a big investment package of almost $46 billion Dollars and in future, this investment amount of $46 billion is expected to increase after initiating new projects by China. CPEC mainly targeted four areas Energy, Infrastructure, the Gwadar city/Port and Industrialization where this investment will be invested (CPEC PROJECTS , 2015).

The transit corridor of CPEC is a road-networking which has been planned to be built from China to the Gwadar Port. The Federal Government of Pakistan has planned that transit corridor will has only one route from China to Attock (Hassanabdal) District in the north of Pakistan and from Khuzdar District to the Gwadar Port in the south of Pakistan. In the remaining districts from Attock to Khuzdar Districts, three different routes of transit corridor

of CPEC were finalized to be built by the Government of Pakistan. The three routes of CPEC from Attock to Khuzdar districts are named as Eastern, Central and Western route. The districts, from where the three Eastern, Central and Western Routes of CPEC will pass, have been showed in below diagram.



1.1 Problem Statement

China-Pakistan Economic Corridor is unanimously being taken as the sign of social and economic development in Pakistan. But, there was big dissention about the routes of CPEC among the provinces, the political parties and the federal government of Pakistan because, initially, the federal government more focused on the construction of the eastern route and ignored the western route. Latter, owing to stern resistance from the provincial governments of small provinces like Balochistan and KPK and the political parties, the federal government had to announce that both the western and eastern routes will be built simultaneously and work was started on the construction of both the routes.

Now, currently, the federal government of Pakistan started work on the eastern and the western routes of CPEC simultaneously because of political pressure by the politicians and

the provincial government. The Government didn't adopt a research-based comprehensive approach for the selection of the routes which was required to investigate that which route is better than other.

Although, the federal government had to build both the routes simultaneously because of political factors that can't be ignored at any cost, but, still, the government needed to focus more on the development of such route which would be more efficient economically and socially for Pakistan in future. It was very much required because the routes of the corridor aren't just roads but they will contain huge investment and many development projects like infrastructure, energy, industries and etc.

Aside from political debate on the routes of CPEC, a technical debate also exists on the route controversy in which the experts of various relevant fields were arguing on the positives and negatives aspects of both the routes. They mostly argued on the basis of non-political factors like Social and Economic. The experts stressed that although political factors are important but other factors can't be ignored to consider prior to launching such a huge investment on these routes of CPEC.

Although, the experts of various fields are involved in highlighting the potential strength and weakness of both the routes on the basis of different social and economic factors but, still, it isn't enough for two reasons: Firstly, most of the debate is lacking research-based arguments, even in the case of experts. They cast their vote in the favor of anyone route out of two without doing a proper research. Secondly, if some individuals and think tanks did research to evaluate the routes of CPEC, they didn't compare them on the basis of comprehensive criteria. One might easily consider one or few important aspects and ignored others. For instance, if, in one research-study, the two routes of CPEC were compared on the basis of political factors then, others important factors like social, economic and environmental were ignored for the comparison of the routes. Thus, a research-based investigation study was

required that fill this gap by evaluating both the routes of CPEC on the basis of such comprehensive criteria framework that consists of all the important factors simultaneously. It was not only required to better understanding of the route controversy but also help to resolve route controversy of CEPC.

1.2 The Significance of the study

As it is depicted above that the routes of CPEC have not been evaluated yet. But, recently, acknowledging the importance of this aspect, the Higher Education Commission (HEC) of Pakistan initiated a project to evaluate the eastern and western routes of CPEC and find out the optimal route out of both proposed routes of CPEC. This research study is the part of that project approved by the Higher Education Commission (HEC).

So, now, in this research study, both the routes have been compared on the basis of Political, Economic, Social, and Environmental factors and established which route is more feasible and efficient than other. Thus, this research study has filled this gap which wasn't fulfilled yet. In this way, it did an important addition to the literature on China-Pakistan Economic Corridor.

In this study, a multiple criteria framework has been established to compare both the routes. This framework has been developed in such a way that has not only been used to find out optimal route of CPEC but it will also be a foundational study to find out optimal option out of available alternatives of any project like roads and Dams with certain modification according to the requirement of any projects.

The results of this study will help the government of Pakistan to take decision about the future management of CPEC because, now, they have research-based information that which route is more efficient in term of business, security situation, and environment etc. So, after the completion of this research, the decision-makers have opportunity of policy-making pertaining to CPEC in the light of research-based guidance of this research. The private

business groups and individuals will also be potential users of this research study because it has been investigated that which route is more business-friendly in future. By the results of the study, they can take guidance which route is possibly more suitable for their businesses than other.

1.3 The objectives of the Study:

i. To develop a multiple criteria decision-making framework for the decision of the optimal route of CPEC on the basis of Political, Economic, Social, Technological, Legal and Environmental factors.
ii. To compare the eastern and the western routes of CPEC on the basis of multiple criteria framework and find out the best route out of two the routes of the corridor.

1.4 The Research Questions

i. What are the significant factors for the comparison of the two routes of China-Pakistan Economic Corridor?
ii. What are the strengths and the weaknesses of the two routes of CPEC?
iii. Which one out of the two routes of CPEC will be optimal route for Pakistan based on a defined multiple criteria?

1.5 The Composition of the Study

This research study has been divided into various chapters. First chapter consists of the introduction of study. Second chapter is based on literature review. Third chapter consists of the methodology of the research study in which the whole method of conducting the research has been expressed. The fourth chapter is based on comprehensive criteria framework. The fifth chapter of this study consists of the results and analysis and final chapter contained the conclusion of this research study.

Chapter 2

Literature Review

China-Pakistan Economic Corridor (CPEC) is a development and economic project that contains many things, Investment, Infrastructure Development, Energy production, Regional Connectivity, Trade and etc. It would have multiple effects not only on Pakistan but China too.

It is a win-win situation for both China and Pakistan because it has lot of economic and social benefits for both the countries (Ahmar, 2015). The government of Pakistan claims that CPEC is Game-Changer project because it will make strong Pakistan economically and strategically in the region as well as in rest of the world (AMIR, 2016).

It has increased the investment in Pakistan by 38.8% in fiscal-year 2015-16 than previous fiscal year (Alam, 2016). It is also expected that it would add to GDP Growth of Pakistan's economy by 2% annually. According to some estimated reports, CPEC would produce 2 million direct and indirect jobs in Pakistan (Khan, 2016).

The China-Pakistan Economic Corridor (CPEC) will also make the defense of Pakistan more invincible through both direct and indirect ways. It will strengthen Pakistan strategically by improving the economic situation of the countries because defense always depend on the national income of the country.

2.1 National and Local implications of CPEC

China-Pakistan Economic Corridor is not only transit-trade route from China to the Gwadar Port but a big investment package that has target many essential sectors in Pakistan. Secondly, it is a huge development in term of physical projects that is being taken place in all over the country. Therefore, CPEC is affecting Pakistan through many ways.

2.1.1 Political

Although, CPEC is being unanimously taken as a development project in Pakistan but, some dissension on the routes of CPEC among the politician is existed too. The routes of the Corridor are a major contradiction among the politicians especially from small provinces like Khyber-Pakhtunkhawa (Zimmerman, 2015). In these provinces, this notion was being generated that CPEC is the Corridor between Punjab province and China instead of China and Pakistan. The biggest objection of the Governments of KPK was that western route isn't the part of CPEC as same as eastern route. Therefore, the government is making just a simple road of two lanes on the western route whereas, on the eastern routes, a full-fledged motorway is being made which has designed on control-traffic mode (Zarkoon, 2016).

The governments of western provinces Balochistan and Khyber Pakhtunkhwa have also objections on the distribution of investment based projects of CPEC. Many times, the Chief Minister of Khyber Pakhtunkhwa cleared that the federal government must give KPK a complete economic corridor; we don't compromise just on a Highway (ALI, 2016). The politicians of Khyber Pakhtunkhwa demanded a route along with investment based projects (Marwat, 2016).

The KPK has also objection on the distribution of the projects especially energy projects under the China-Pakistan Economic Corridor because it has got fewer projects than all other three provinces (Khan, 2016). KPK has got only eight projects from the total whereas Baluchistan got sixteen projects which is double than KPK. The province of Balochistan has some different issues relating to CPEC than Khyber Pakhtunkhwa. The government and other stakeholders from Balochistan want that Gwadar Port should be given in provincial control and the entire Income of Gwadar Port should be given to Balochistan Province.

The politicians must have to come on same page about the selection of the route and other demurs on CPEC; otherwise, it might lead to political unrest in the country. Dr. Kaisar

Bangali, in his research study, suggested that the decision makers have to build both the routes without keeping in mind the security threats to western alignment. Otherwise, it would create sense of deprivation in least developed areas and deprivation always leads toward crimes in the country (Bangali, 2015). Further the history repeats itself like there were few projects like Kalabagh Dam which were lifetime projects for Pakistan but couldn't be completed because of political disagreement (Sial, 2015).

The Government shouldn't initiate any project of CPEC without political consensus because it can create chaos in the country. In some cases, more time is required to build consensus but once it is developed, it ensures socio-political stability in the country in future as well as efficient utilization of the resources deployed (AMIR, 2016). The Colombo Port City project is the best example in this case when Sri-Lanka government didn't build the port until they developed political consensus on it.

2.1.1.1 Internal Threats

There were various types of internal security threats to CPEC like separatism and terrorism in all over Pakistan. For instance, in Balochistan and Khyber Pakhtunkhwa, there are some terrorist and separatist outfits that were involved terrorist activities in the country. Those separatists used to target the Chinese workers who are working in Balochistan (Abid & Ashfaq, 2015). Due to these challenges, the development companies weren't able to work at their full potential.

The government of Pakistan firmly took action against every sort of security challenges to the corridor. For instance, Pakistan Army established a security division "Special Security Division" which comprises of nine army battalions and six wings of Para-Military forces in Ranger and Frontier Corps and it is headed by a Major-General rank army officer (Ahmar, 2015).

Despite all these measures to secure CPEC, the government has also made very hard decision to eradicate the terrorism. The security forces started operations against such terrorist outfits like Zar-be-Azam (Rizvi, 2015). Although terrorism and separatism are yet a security threat to CPEC but, currently, after taking these decisive measures, terrorist activities have been reduced significantly in Pakistan. So, it is envisaged that China-Pakistan Economic Corridor would have positive effects on the economic and security situation of Pakistan: on the one-side, it would positively contribute to the economy of Pakistan and on the other-side it would bring enormous in term of security and stability (Esteban, 2016).

2.1.1.2 External Security Challenge

India stands in the front line against China-Pakistan Economic Corridor (CPEC) and its Research and Analysis Wing (RAW) is fully operated to doing terrorist activities against the corridor in Pakistan. Recently, Raw has opened a special office in Delhi and it is working under direct control of Indian Prime Minister (Abid & Ashfaq, 2015).

India is operating itself against CPEC on the many forums. It is using the surface of Afghanistan and Iran where terrorist groups and camps have been established. India is also doing another very important investment at Chahbahar Port of Iran. India is preparing Chahbahar Port of Iran as the rival of Gwadar Port (Hali & et.al, 2014). By establishing Chahbahar, India wants to use it for its strategic purposes against Pakistan in future. Although, CPEC is facing some external security challenges in present but in future, it will absorb all such threats and brings national and regional stability and security, especially in Pakistan and Afghanistan (Esteban, 2016).

2.1.2 Economic Factors

The economy of Pakistan is another area for which China-Pakistan Economic Corridor is very essential. CPEC has direct effect on the economy of Pakistan. In this section, the effect

of CPEC on the various aspects of Pakistan's economy will be reviewed with the help of given literature.

2.1.2.1 Economic Growth

China-Pakistan Economic Corridor will have significant contribution to the National Income or the GDP of Pakistan. CPEC would increase the GDP Growth of Pakistan's economy by 2% annually when Pakistan comes out from energy crisis because of installation of new energy projects under CPEC (Abid & Ashfaq, 2015). It has also estimated that due to China-Pakistan Economic Corridor (CPEC), Pakistan would get $40 billion extra revenue when CPEC fully implements (Safdar, 2015).

The Gwadar Port will become a big source of income for Pakistan due to huge expected trade activity as similar as Karachi Port is producing 70% of the total revenue that is vital contribution in the economy of Pakistan (Khetran, 2015). Tourism is another sector which will expand after the completion of the Corridor between Pakistan and China. There is lot of potential of tourism in the northern area of Pakistan that will get boost because of better connectivity, fast and save travel toward those areas (KHAN, 2015).

2.1.2.2 Infrastructure Development

Currently, the prime focus of CPEC is infrastructural development in Pakistan. The Government is spending billions of dollars on infrastructure like Roads, Railway lines, Trade-Markets, Dry-ports and New-Cities etc. Industrialization is another very important component of (CPEC) in Pakistan. Many Industrial Parks and Processing Zones will be built in Pakistan. According to a report, established 29 industrial parks and 21 processing zones will be established at various places in the country (Malik, 2016).

Special Economic Zones (SEZs) under CPEC will bring the development of high-tech industrial zones in Pakistan which will further enhance the exports of the country and expand the research and development (R&D) culture (Ali & Dr. Farida Faisal, 2016).

2.1.2.3 Employment

The economic corridors bring business and livelihood opportunities in the adjacent areas of the corridors. (Phyrum & et.al, 2007). China-Pakistan Economic Corridor will also bring employment opportunities at very large level especially in energy sector. It will be more beneficial for under-developed areas because a big chunk of the investment of energy sector is being invested in the remote area of the country like Thar Desert where unemployment rate is higher than developed areas (Abid & Ashfaq, 2015).

CPEC will also generate employment opportunities in many sectors other than Energy Sector. The trade routes of the Corridor will generate employment at high level. The transportation sector will expand when the Trade-Caravans start to run from China to the Gwadar Port (Ahmad, 2015). When trade caravan starts, the employment opportunity will automatically generate in the country. As the result, people will get many sources of livelihood, after completion of CPEC. According to an estimate, CPEC would generate approximately two million direct and indirect jobs in various sectors (Safdar, 2015). Entire the country will be beneficial from this opportunity because CPEC has targeted all the parts of Pakistan.

2.1.2.4 Trade

The Economic Corridors always positively affect the development of the country through promoting trade and industrial agglomeration (Neogi, 2014). They expand the trade within the country as well as among regional countries because the construction of transit corridor makes transportation system better (Phyrum & et.al, 2007)& (Rahman, 2014). Economic Corridor also reduces trade barriers among neighbor courtiers by dwindling time and money that have to be spent at border (Dutta & Gupta, 2014)& (De, 2014).

China-Pakistan Economic Corridor has lot of potential of regional integration at international level. This project will improve the connectivity of Pakistan with all sub-regions of Asia, Europe and Africa. It will also provide new routes which connect Central-Asia, South-Asia

and China with Europe and Africa (Abid & Ashfaq, 2015). It will remove investment and trade barriers that create a new business environment among these regions.

There are many benefits of the proposed Economic Corridor for the exports and imports of Pakistan. Some sectors textile, agro-food, sporting-goods and mining will be more beneficial from the improvement of connectivity and regional trade (Esteban, 2016). Secondly, these sectors are producing major chunk of Pakistan's export especially those commodities which are being exported to China.

2.1.2.5 Investment

The economic corridors and investment are closely correlated to each another. There are many international economic corridors which brought investment in the areas behind the corridors. For instance, Southern Economic Corridor (SEC) in south Asian region would bring high investment in those areas, if it is developed, according to the author (Phyrum & et.al, 2007). Alike other corridors, it is expected, CPEC would bring investment in Pakistan at large scale.

Due to security issues in previous years, international investors are reluctant to come in Pakistan but, now, after taking harsh action against terrorism by the Government, the security situation has currently been improved than last few years. So, now, it is necessary to rebuild the trust of international investors for Pakistan. China-Pakistan Economic Corridor will not only bring Foreign Direct Investment (FDI) in Pakistan but it will also help to improve the confidence level of international investors for Pakistan (Esteban, 2016).

There is a report by the Government that the investment under CPEC is higher than the portfolio of the total Foreign Direct Investment (FDI) which Pakistan received since 2008 (Safdar, 2015). There is another estimate which asserted that the portfolio of CPEC $46 billion is higher than the aid was received by Pakistan from the USA since 9/11 (Sial, 2015).

In fiscal year 2015-16, Pakistan has received 38.8% higher investment than the previous fiscal year (Alam, 2016).

2.1.3 Social Implications

The transit and economic corridors mostly have positive effects on the living conditions of the people of the adjacent areas of the corridors because they mostly bring business and livelihood opportunities in the areas behind the corridors (Phyrum & et.al, 2007) (Dutta & Gupta, 2014). China-Pakistan Economic Corridor (CPEC) would have profound effect on the social life of the society (Haq & Farooq, 2016). Life-style always varies with income level. When income level changes, the standards of living are also changed and the changes in life-style lead to change in the culture of society (Esteban, 2016). Through this channel, CPEC will bring changes in the culture of the adjacent districts of the routes of the economic corridor because it would significantly affect the income-level of the locals by giving more employment opportunities.

The effect of CEPC on the social welfare of Pakistan's society will positively be significant in future. The researchers measure the welfare effect of CEPC for almost all the districts on the basis of three dimensions of welfare *Education, Health and Housing*. It has been estimated that social welfare will grow at more than 5% in soon future in Pakistan (Haq & Farooq, 2016). This growth rate will be higher in those districts which are least developed and located behind the routes of CPEC.

In future, there will be huge change in demographic order of Balochistan and especially Gwadar city. Due to numerous employment opportunities, millions of people will move to those areas from rest of the country (Abid & Ashfaq, 2015). According to Gwadar Development Authority (GDA) estimates, 1.7 million people will migrate only in Gwadar in coming thirty years (Hali & et.al, 2014).

2.1.4 Environment

The construction of roads and physical development affect society in direct as well as indirect ways. The direct effects are migration, damages of vegetation and wildlife while dust and noise pollution are the indirect effects of the construction of roads and developments (Ishida, 2007). These effects can be mitigated by taking premature measures like changing the maps of road and using advance techniques of construction (Karani, 2012).

Weather mostly has lot of effect on the development projects especially on the construction and maintenance of roads. Transportation system is more affected by weather and climate changes like hot summer session, thunderstorms, flood and etc (Nemry & Demirel, 2012). These weather threats can be eliminated by conducting comprehensive feasibility studies prior to the construction of routes and projects. These natural adversities are controllable and a country can minimize its damages from climate changes by taking pro-active measures. The countries which take pro-active measures and adaptations to control climate changes have to bear relatively less losses than the countries which don't take such measures (Amy & et.al, 2014).

Alike every development project, the projects of CPEC especially routes and environment are sensitive to each another because development projects affect the local environment. The climate changes also affect the construction and the maintenance of the projects. Therefore, environment effects and climate changes should keep into mind before starting the projects under CPEC.

2.1 The criteria of choosing routes

Many routes of transit and economic corridors were made according to the need of trade. All the trade routes and corridors had such reasons and needs of their construction on the basis of which they had been found out and selected for construction. The Suez-Canal, the Panama-Canal, the White Sea-Baltic Canal, the Grand-Trunk Road, the Old Silk Road, Greater

Mekong Sub-region (GMS) corridor and many others are the examples of the man-made trade routes. Many of them were made in past but they are still very significant in international trade.

2.2.1 Waterways and Sea-routes

The White-Baltic Sea Canal in Russia was planned to build form the White-Sea to the Baltic-Sea because Russia wanted to build a fast and easy logistic alignment till its eastern Karelia. Russian evaluated this project by three factors *construction cost, strategic importance and logistics* (Morukov, 2004). At that time, the canal wasn't feasible although it was strategically important for them because the construction costs were too high for private sector and state financing wasn't available for it. Hence, Russia planned to build a railway line instead of White-Baltic Sea Canal Because Railway line required less resources.

The Panama Canal is another sea-based trade route which was made in North-America and it is still very busy trade-route in present. The United States of America (USA) was very interested to build the Panama Canal because it was shortest, viable and sea-based trade route for America (Maurer & Yu, 2016). America had two optional countries Colombia (Panama) and Nicaragua where it could construct canal-route between the Pacific and Atlantic Ocean because the thinnest soil between both the Oceans lies in these two countries.

At that time, American compared to the possible routes on the basis of factors such as: *Distance of the route, construction cost, environmental and political situation of both countries.* Later, American decided to build panama canal in Colombia (Later became Panama) because it was shorter route than Nicaragua; it demanded less construction cost; Nicaragua was seriously affected by Volcano and later, Political factor was also fallen in the favor of the Panama Canal (Maurer & Yu, 2016).

The Volga-Don Canal in Russia is another case of choosing best route out of alternatives routes. The Russian government wants to construct a new maritime route between the

Caspian and Black Sea although Russia already has Volga-Don Canal route which connects both the Seas with each another. The new proposed route "Eurasian Canal" has been compared with Volga-Don Canal on the basis of *transportation costs and time, expected commercial and commerce activities and Net benefits of the project* (Vinokurov, Balas, & Michael Emerson, 2016). After the comparison, Russian decided to build this new canal.

It was calculated that this canal would be shorter trade route than the Volga-Don Canal between the Caspian and Black Sea because of its design. It would reduce the travel time from 7 days via the Volga-Don Canal to 3 days via the Eurasian Canal between the Caspian and Black Sea. The Eurasian Canal would also reduce the transportation cost of goods by 2-3 US Dollars per ton of Cargo than the Volga-Don Canal.

The availability of resources and the construction costs and benefits of projects are the two key factors which emphatically remain present in the pre-evaluation study of every trade route project. For example, Russia wanted to make White-Baltic Canal to build link between the White and Baltic Sea but they had to go for its alternative project which was railway line (Morukov, 2004). The railway line wasn't as much profitable as Canal route but they had to go for railway projects due to lack of funds for Canal projects.

2.2.2 Land Based Trade Routes (Transit Corridor)

Some land-based economic and transit corridors were also established in various regions of the world. All those trade corridors had been built according to their respective needs. But, both economic and transit corridors in everywhere were finalized on the basis of a specific selection-criteria, according to the nature of project.

An important purpose of the establishment of economic corridors is to enhance trade between regional countries. The Economic corridors are constructed to liberalize and boost the regional trade because they remove the trade barrier like trade quotas and bring trade facilities like road-networking and better cross-border trade management system

(Teravaninthorn & Raballand, 2009). These corridors are also made to give access to land-lock countries till the sea-route and other regional markets. So, ultimately economic corridors boost regional trade (Arvis & et.al, 2011). For example, there are three different economic corridors in south-eastern region which collectively known as Greater Mekong Sub-region (GMS). These three corridors had been compared on the basis of *Distance, Population density, Gross Regional Product per Capita* (GRP) to check which corridor is more efficient than others (Ishida, 2007).

Multi-criteria Decision Making (MCDM) technique was used to explore all the possible routes of High Speed Rail Corridor in Texas (America). The criterion of this technique was based on few important objectives: *maximize travel demand (population), maximize potential service area, minimize total cost and minimize environment impact* (Benjamin R. Sperry).

The northern corridor in East Africa is very important and the biggest corridor of African continent in term of distance and trade volume. It starts from the Mombasa Port of Kenya to till Congo. It passes through the following countries Kenya, Uganda, Rwanda, Burundi and Congo. There were two key factors behind the construction of this corridor. *First of them was the provision of possible shortest access till sea to land-lock countries and second of them was the selection of the most efficient sea-port* (Teravaninthorn & Raballand, 2009). This corridor was started from the Mombasa port of Kenya because it is largest port in East Africa having with latest facilities and equipments.

The north-south corridor in South Africa is another international corridor which starts from the Durban Port of south Africa and it passes through South Africa, Botswana, Zimbabwe, and Zambia. The Mombasa Port and the Beira Port are two rival ports in the region. Although, the Beira Port is closer than the Durban Port of South Africa for Zambia and Botswana but they use north-south corridor because of *well-developed road infrastructure,*

the Durban Port having with latest facilities and lower maritime transport rates of north-south corridor (Teravaninthorn & Raballand, 2009).

First and second Mekong Lao-Thai Friendship Bridges are the examples of transit corridor between Thailand and Lao. It was constructed to *increase the mobilization of people, investment, technology and goods* by building required infrastructure across the border areas and eliminating across border barriers (Keola, 2013). It was estimated that the construction of these bridges improved the regional integration between regional countries which would further boost tourism, trade, Foreign Direct Investment (FDI) and etc.

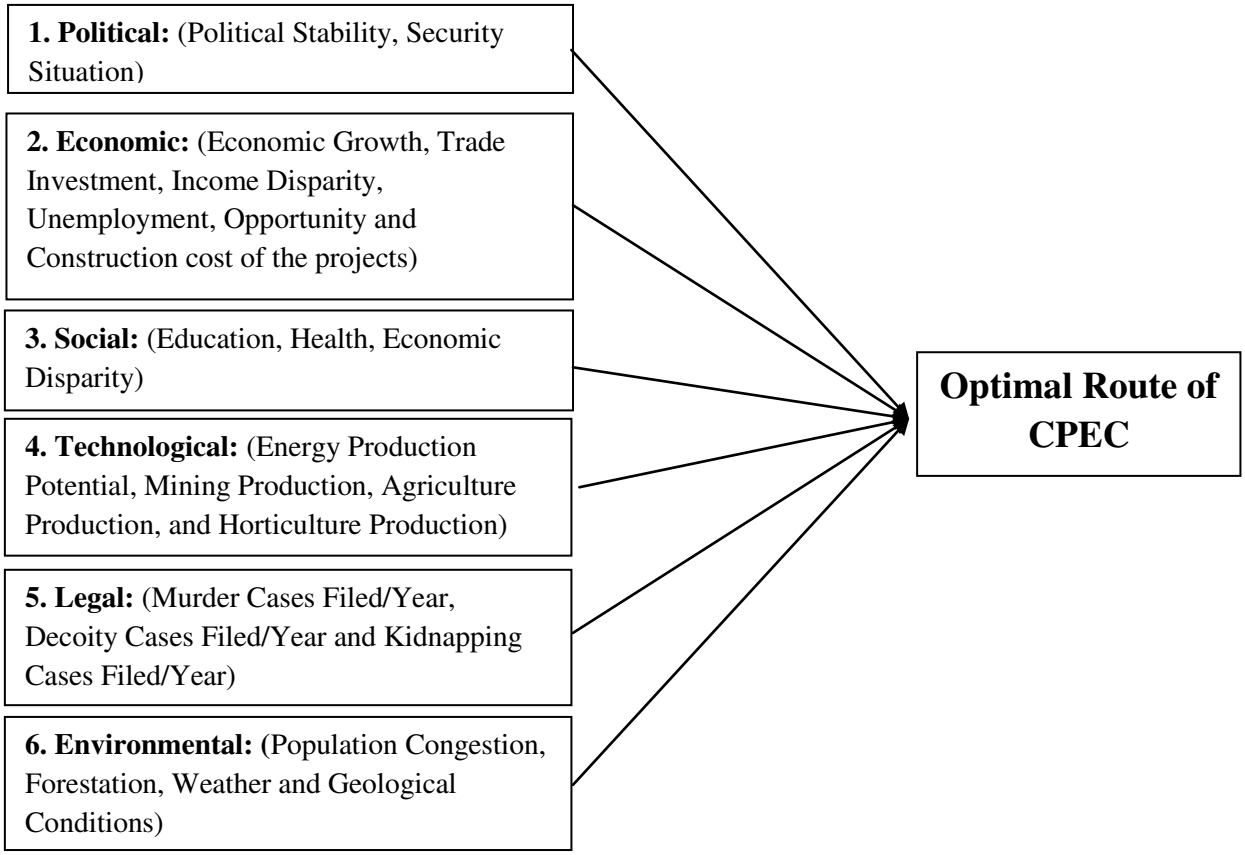
2.3 Theoretical Framework

Although, a limited numbers of research studies have yet been conducted on China-Pakistan Economic Corridor (CPEC) that covered some important aspects like the effects of CPEC on social welfare, the economy of Pakistan and strategic consideration but, still, many vital areas of CPEC that have not yet got the attention of researchers. The routes of CPEC are also one of those neglected areas that will be studied in this study. Now, in this research study, this gap will be filled by evaluating both the routes. Thus, the core objective of the research study is to do comparison of both the eastern and the western routes of CPEC to explore the optimal route.

The comparison of the routes is a complex piece of work because there are many important objectives and factors that simultaneously affect the decision of the selection of efficient route of CPEC. Even though, in this research, the optimal route of CPEC will be explored by comparing both the routes on the basis of all those momentous factors. There are many Political, Economic, Social, Technological, Legal and Environmental factors which have been chosen for the selection of optimal route of CPEC. All those factors have been mentioned below: In Figure No. 2, all those factors have been showed in both broader and sub-categories.

Optimal route selection = *f (Political, Economic, Social Technological, Legal and Environmental Factors)*

Diagram No. 2



All these factors have been extracted by reviewing the literature on CPEC and economic corridors in other countries. Thus, the literature on CEPC and international corridors has also been reviewed in the chapter of literature review. As it is stated above, there are many objectives and targets of China-Pakistan Economic Corridor that can be maximized by opting optimal route of this corridor and many factors that can simultaneously affect the decision of the selection of the routes of CPEC. But, all the objectives and factors have to be evaluated simultaneously to examine the optimal route out of two routes of CPEC. So, all those objectives and factors will be considered by using a specific evaluation technique that can covers all these aspects.

Chapter 3

Methodology

CPEC is a project of investment and physical development in many sectors which has mainly been divided into the eastern and western routes. It has many social, economic, political and environmental implications for Pakistan. Therefore, it was necessary to comprehend all the potential objectives of CPEC prior to do comparison of both the routes because the two routes have been compared to each another on the basis of those potential objectives of CPEC and the factors that can affect the routes of CPEC.

Thus, in this study, Value Focused Thinking (VFT) has been applied to extract the potential objectives and targets of CPEC whereas and Multiple Criteria Decision Making (MCDM) techniques has been applied to examine the optimal route of CPEC by comparing the two routes on the basis of comprehensive criteria extracted from the multiple potential objectives of CPEC. The use of these techniques warrant detailed discussion on how to apply them therefore, section 3.1 is devoted to VFT and 3.2 elaborate MCDM.

3.1 The Value Focused Thinking (VFT) Technique

It is a step-by-step procedure that gives insight to the decision makers on the multiple alternatives of a project. VFT is used to construct a decision making model based on the potential objectives and sub-objectives of a project. Then, an optimal out of all the available alternatives is tried to find by comparing them on this decision making model. To begin with, this technique needs identifying the broader objective of a project like CPEC in the context of Pakistan. Thus, in this study, the fundamental potential objective of CPEC has been taken as the prosperity and well-being of the people of Pakistan. By applying the VFT technique, we decompose the one broader objective into six objectives. Further, these six objectives have been divided into six sub-objectives. This process of disintegration keeps on until all aspects

of potential objectives become clear and quantifiable and criteria can be constructed or assigned to the lower level objectives.

For example, prosperity and well-being can't be quantified easily. So, the VFT technique recommends simplifying it into more objectives by asking the question of "what do you mean by prosperity and well-being?" The answer can be: By prosperity and well-being, we mean economic & social prosperity with minimum environmental degradation, maximum technological advancement, stable political and security situation. For instance, it means not just preventing further degradation of earth's systems, but actively restoring those systems to full health. The question leads to the identification of first tiers of objectives: Political Stability, Sustainable Economic Growth, and Social Prosperity, Technological Advancement, Better Security Situation and minimization of environmental degradation.

The objective "sustainable economic growth" is further broken down to identify lower level objectives such as: minimize the construction cost of the routes of CPEC, minimizing economic disparity, maximizing trade and increasing investment. By the construction cost of routes, we mean minimizing the cost of labor, transportation and land and so on. Now if we look at the cost of labor, it's quantifiable i.e. wages per month can be measured for both the routes of CPEC.

Now, making all the factors extracted from the potential sub-objectives quantifiable and measureable, a comprehensive criterion framework has been generated for this study. As the broader objective of CPEC has been divided into six objectives such as Political objective, Economic objective, Social objective, Technological objective, Legal objective and Environmental objective, therefore, this framework consists of six sections. Further, these sections consist of 36 criteria in order to quantify all the objectives and sub-objectives. The Brief information about the comprehensive framework based on multiple criteria has been

placed in Appendix (A) table A.1, while the detailed discussion on the frame is presented in Chapter 4.

After the completion of the framework, all the criteria have been discussed with the relevant experts of each section. For instance, the criteria of environment and economic sections have been discussed with environmental and economic experts respectively. In these meetings, the experts were asked to assign weights to all the criteria of their relevant section by comparing them on the basis of their relative importance. The experts assigned weights to all the criteria of each section by comparing them on the basis of their experience and judgments. Later, these experts' judgments, which are called "weights" in this study, have been entered into M. MACBETH software to estimate the results. This software estimated the results by using these weights and the data of all the criteria. The detailed working function of the software will be explained in MCDM Technique Section.

3.2 The Multiple Criteria Decisions Making (MCDM) Technique

The Multiple Criteria Decision Making (MCDM) technique is a branch of operational research dealing with finding optimal results in complex scenarios including various indicators, diverse ranges of objectives, factors and criteria. There were many factors that could simultaneously affect the selection of the routes and many objectives and targets of CPEC that could be maximized by opting optimal route of the corridor. But, all the objectives and factors had to be evaluated simultaneously to find the optimal route of CPEC. Therefore, an evaluation technique was required that can estimate optimal route out of two alternatives by covering various objectives, targets and factors. Hence, MCDM technique had been opted to compare both the routes of CPEC on the basis of diverse ranges of the objectives, targets and factors. Another reason of choosing this technique was that, in present, it is being widely used in such situation where optimal option has to be selected from more than one alternative, on the basis of many objective, factors and criteria. (Kumar & et.al, 2017).

3.2.1 Measuring Attractiveness by a categorical Based Evaluation Technique (MACBETH)

MCDM technique is applied by using various methods. So, in this study, it has been applied by using Measuring Attractiveness by a Categorical Based Evaluation Technique (MACBETH) method. The seven MACBETH semantic categories are: no, very weak, weak, moderate, strong, very strong, and extreme difference of attractiveness.

3.2.1.1 M. MACBETH SOFTWARE

In MCDM technique, few software's are used which are selected according to the selected method for this technique. M. MACBETH software is used in Measuring Attractiveness by a Categorical Based Evaluation Technique (MACBETH) method. Therefore, this software has been used to estimate the results of this study.

This software requires two types of data to estimate the results. Firstly, it requires the data of all the criteria of framework. For instance, if one criterion is unemployment and there are two alternatives, this software requires the data of unemployment to compare both the alternatives to each another. Secondly, it requires the weights assigned to all the criteria of each objective of framework. For this data, all the criteria are compared with each another and weights are assigned based on their relative importance within each objective. The detail of assigned weights is placed in Appendix (A) table A.3. Later, these weights are entered into M. MACBETH software.

After taking these two types of data, this software multiplies the values of the data of all criteria with their weights and calculates the scores of each criterion for all available alternatives. Higher the score of one alternative gets, better the rank of that alternative possess. If one alternative has higher score it means that alternative is better than all other alternatives.

Thus, in this study, these two types of data have been entered into the software as same as the software is required. The data of all the criteria of the framework has been acquired from different data sources that have been mentioned in detail in Research Techniques section and the data of the weights has been got by the experts' judgments. This weights assigning process by the experts has also been narrated in above Value Focused Thinking Technique section. After entering the data into the software, the results have been estimated for all the criteria. This software has calculated all the results between zero and one scale. Thus the detailed discussion on these results will be done estimated in fourth chapter "Results and their Analysis".

3.3 Research Method

China-Pakistan Economic Corridor is a big project that covers many areas and sectors. Most of the areas of CPEC like trade are very important for research and evaluation. But, here, the focus of this study will only be on the evaluation of two routes instead of any other aspects of CPEC. Therefore, the design of research study has been chosen "case study".

3.3.1 Research Sample

In this research study, all the districts, from where the eastern and western routes of CPEC would pass, have been taken as sample size. The districts on both sides, which have rendered their areas for the construction of the routes, have been recognized as the districts of both the routes. These two routes would pass through 27 districts from Attock to Khuzdar District. The areas of 17 out of total 27 districts have been used by Eastern route while remaining eight districts have been touched by western route. The names of all the districts of both the routes are mentioned below:

Eastern Route: *Attock, Rawalpindi, Chakwal, Khushab, Sargodha, Hafizabad, Faisalabad, T.T Singh, Jhang, Khanewal, Multan, Bahawalpur, Rahim-Yar-Khan, Ghotki, Sukkur, Shikarpur, Larkana, Shahdad-Kot and Khuzdar*

Western Route: *Attock, Mianwali, D.I Khan, Zhob, Qila-Saifullah, Pishin, Quetta, Mastung, Kalat and Khuzdar*

3.3.2 Research Strategy (Techniques)

In this research study, "quantitative data technique" was opted as "research strategy" for this study because quantitative data has been used to evaluate the two routes of CPEC. In quantitative data, secondary data has only been used. The most recent available data for all the criteria has been acquired in this study. The comprehensive criteria framework of this study is very broad which consist of six sections like Political, Economic and Environment etc. Therefore, many types of data sources have to be accessed to get the data for all the criteria of each section. Now, all the data sources, which have been used for getting the data, have been presented in a broad list in table 3.1 below whereas a detailed list (criteria wise) is placed in Appendix (A) table A.2.

Table 3.1: Broad List of Data Sources

Serial No.	Sources
1	Bureau of Statistics of Four Provinces and Federal
2	Pakistan Social and Living Standards Measurement (PSLM) Survey 2014-15
3	National Disaster Management Authority (NDMA) Annual Reports
4	Pakistan Metrological Department (PMD)
5	National Highway Authority (NHA)
6	Solar and Wind Energy Resource Assessment (SWERA)
7	Police Websites of four provinces
8	Land Record Atlas of Four Provinces and Pakistan
9	Pakistan Statistical Book 2014
10	Labor Force Survey of Pakistan 2013-14
11	Pakistan Security Report 2014 (PIPS)
12	Census of Manufacturing Industries
13	Distance Calculator Globe Feed. Com
14	Literature(Books, Articles and Newspaper)

Chapter 4

Comprehensive Framework Base on Multiple Criteria

This chapter contains the detailed formulation of Comprehensive Criteria Framework, which is output of the VFT discussed in Chapter 3, section 3.1. Although, the brief information about the framework has been placed in Appendix (A), table A.1. But detailed information about the objective, sub-objective, factors and criteria of this framework including their theoretical and logical relevance along with the measure used is discussed in detail below.

4.1 Maximizing Political Stability

In this framework, the first potential objective of the routes of CPEC has been taken as to bring maximum political stability in the country. Here, political stability means the political consensus among all the political actors, provincial and federal governments which is imperative to successfully initiate and complete a project. Political consensus helps to maximize the benefits from economic and physical development opportunities. In other words, the more the political consensus on a mega-project, the higher the benefits it would bring. For example, The Greater Mekong Subregion is getting enormous benefits from trade and economic corridors but the countries of this region like Thailand, which are instable politically, have gained less economically as compare to those countries which are politically stable (Krongkaew, 2004).

On the other side, political disagreement can be a big impediment in way of economic and physical development (Shrestha & Chongvilaivan, 2013). Further, the history repeats itself like there were few projects like Kalabagh Dam which were lifetime projects for Pakistan but couldn't be completed because of political conflicts (Sial, 2015). Political instability in one country doesn't only damage the development process of that country but it also adversely affects its regional countries. For instance, when one country, which has an international trade corridor, becomes instable politically, it negatively affects all those countries which use

that corridor (Faye, Sachs, & Snow, 2004). Now, two criteria, such as The Number of Objections Raised by the Provincial Governments and the Political Parties and the Relationship with Neighbor Countries, have been taken to which out of two routes will bring maximum political stability in the country.

Here, the number of objections raised by the provincial governments and political parties means how much concern all the provincial governments and political parties of Pakistan have showed in the favor of anyone out of two routes. Here, the higher the concern on a route mean the more the demand of that route exists. Thus, this criterion has been used to check the opinion of all the political stakeholders about both the routes. It is very important to examine because political consensus is always required to initiate and complete a mega project like the routes of CPEC. Here, Kala-Bagh Dam is best example which was very important for Pakistan but couldn't be completed because of political disagreement (Sial, 2015). Hence, by using this criterion, it has been judge that on which route political stakeholders have more concerns. In this criterion, the more concerns on a route means that route is more important to construct to bring political stability. The number of objections raised on the construction of both the routes in All Parties Conferences has been used as data for this criterion.

Second criterion of this section is the number of wars fought with neighboring countries. It means, how many wars Pakistan had to fight with it's all the neighboring countries such as India, China, Iran and Afghanistan in past. This criterion has been taken to examine the relationship between Pakistan and its neighbors. The relationship with neighbor countries is another significant factor to choose best out many alternatives. It becomes more important when the projects are being planned to establish in the areas closed to border. Peaceful relations with neighbors are very imperative for economic and physical development at domestic as well as regional level (Shrestha & Chongvilaivan, 2013). For instance, the projects especially road infrastructure can be adversely affects, if a country has serious

conflicts with its neighbor situated on the other side of border. These conflicts can become a reason of war between two neighbors at any time. Therefore, when these projects are built close to border areas, the relationship with neighbors is significantly considered because war between two countries can severely damage the development in the areas closed to border (RITZINGER, 2015). The number of wars fought in past has been used as data to judge which neighboring countries Pakistan has unfriendly relations. The more the number of wars fought with a neighbor, the more the sensitive relations Pakistan would have with that country.

4.2 Maximizing Sustainable Economic Growth

In economic part, the potential objective of routes of CPEC has been set as to maximize the sustainable economic growth in the country. This main objective of economic part of the framework has been broken down into four sub-objectives: to minimize the construction cost of all the projects of CPEC, to ensure the maximum foreign and domestic investment, to reduce the economic disparity and to maximize the net-trade of Pakistan. Further, these sub-objectives have been divided into seventeen criteria e.g. Unemployment and Cost of Labor etc. Now, all these criteria will be discussed in below with respect to their sub-objectives.

4.2.1 Minimizing the construction cost of Project

First sub-objective is to minimize the cost of the routes of CPEC. When mega-projects of physical infrastructure are built, construction cost always remain an important factor because the lesser the cost of a project, the higher the benefits a society gains (Yagura, 2013). Hence, alike all other mega-projects in the world, the first target is to minimize the cost of both the project. This sub-objective has been broken down into five criteria such as Cost Labor, Transportation Cost, Destruction Cost of Physical Infrastructure, Cost of Agriculture and Horticulture Land. These criteria have been taken to measure the overall cost of both routes.

First out of these five criteria is Cost of Labor which is paid to the laborers when they are hired to construct both the routes and other projects of CPEC. Labor cost always remains an important factor of production especially in the projects of physical infrastructure. In all over the world, business companies and groups always try to minimize the cost of production because, the lesser the cost, the higher the profit one unit of production earns (Ishida, 2007). For example, many Japanese companies had transferred it manufacturing plants in countries like Vietnam to hire cheap labor (Kudo, 2013). Hence, this criterion has been taken in the framework of this study to check which out of two routes will have cheap labor to minimize the cost of labor. In this criterion, the data of wages per month has been used for both the routes. The lesser the wage per month on a route, the fewer the construction cost comes on that route. Thus, the route, which has less labor cost, will be more beneficial. Second out of five criteria is Transportation Cost which means such cost that comes when all the inputs, labor and other required things for the construction have to transfer at construction place. This criterion is also seriously taken into mind before starting the construction of mega-projects in throughout the world (Vinokurov, Balas, & Michael Emerson, 2016). For example, when *the White-Baltic Sea Canal* in Russia was planned to build form the White-Sea to the Baltic-Sea, it was evaluated on the three factor namely, *Transportation cost, strategic importance and logistics* (Morukov, 2004) It is tried to keep transportation cost minimum as much as possible. Hence, both the routes have been compared on transportation cost to keep the construction cost minimum. A route would be more beneficial which has relatively less transportation cost. The distance of both the route from Karachi port has been taken as data which has been used to estimate the transportation on both the routes.

The third criterion of this sub-objective is Destruction Cost of Physical Infrastructure like Buildings and Houses. This criterion means when the routes of CPEC pass from built-up areas, how much they affect the physical infrastructure such as houses, school, and

commercial building etc. In the world, by using destruction cost as a criterion, an such alternative is tried to find which charges relatively minimum cost in term of destroying the buildings (Phyrum & et.al, 2007). Hence, owing to its importance, this criterion has also been included to examine which out two routes will charge fewer prices in term of infrastructure destruction. The total built-up area on both the routes has been used in this criterion as the data. The more the built-up area on a route, the higher the destruction cost it will charge. The route, which brings less construction cost in term of destructing the buildings, will be more preferable route as compare second route.

The fourth and fifth criteria are Agriculture and horticulture land. In this framework of study, these criteria means is that when both the routes of CPEC are built, how much agriculture and horticulture land they can take. As it is well known that Pakistan is an agriculture country and meanwhile, it produces fruits at very large scale. On the other side, both the routes are very long in length. Owing to these reasons, it is speculated that these routes will take agriculture and horticulture land at very large scale. Thus these two criteria have been included in the framework to examine how much construction cost will be charged by both the routes in term of agriculture and horticulture land. These two criteria also used in other parts of the world. For example, in Africa, the growth corridors were compared on these two criteria before their construction (Phyrum & et.al, 2007). The data of production areas of both agriculture and horticulture have been used to judge which out two routes will take more land. The lesser the agriculture and horticulture a route takes, the fewer the construction cost of that route will charge. Thus, a route, which has less construction cost, will be more preferable than second route

4.2.2 Maximizing Investment

Second sub-objective is to maximize domestic and foreign investment in the country. Investment is one of key components of CPEC whereas it is also being expected that this

corridor will bring investment in Pakistan at large scale (Esteban, 2016). Hence, it has been taken a sub-objective of broader economic objective. Now comparing both the routes on this objective, it will be examined that which out of two routes are more attractive for the investment because both domestic and international investors analyze the costs and benefits of their potential investment to maximize their profit (Yagura, 2013). They invest their money where the cost per unit is relatively less because more the cost per unit, lesser the profit would be earned. Hence, in this framework, criteria such as Availability of Labor, Security Cost, Transportation Cost, Cost of labor, has been selected to examine on which route the cost of investment will relatively be minimum to maximize the profit.

First criterion of second sub-objective is the Cost of Labor. In this section, the cost of labor means such cost which is paid to laborers for their services by a businessman. Labor force isn't only important for constructing the projects but, it is an imperative factor of production (Vinokurov, Balas, & Michael Emerson, 2016). In all over the world, business companies and groups always try to minimize the cost of production because, the lesser the cost, the higher the profit one unit of production earns (Yagura, 2013). For example, many japans companies had transferred it manufacturing plants in countries like Vietnam to heir cheap labor (Ishida, 2007). Hence, this criterion has been taken in this section to examine which out of two routes will have cheap labor to keep the cost of labor minimum. In this criterion, the data of monthly wages has been used for both the routes. In this criterion, the lesser the wage per month on a route, the fewer the business cost that route has to bear. Thus, a route, which has business cost, will have more return on the investment.

The second criterion is Availability of Labor which means how much labor force is available on both the routes of CPEC. The availability of labor is taken by the investors as important as the cost of labor because, the quantity of labor has very important affect on its cost (Kudo, 2013). The shortage of labor can lead to higher wages. Another reason is that no business can

be run easily without availability of labor. Thus, the availability of labor is considered an important factor for initiating and running the business in all over the world as well (Vinokurov, Balas, & Michael Emerson, 2016). Hence, it has been included in this section to investigate that on which out of two routes more availability of labor has. A route, where more labor force is available, will be more beneficial for the investment. In this criterion, the labor force participation rate has been used to judge the availability of labor on both the routes.

The third out of four criteria of this sub-objective is travelling cost. It means such cost which the business groups have to pay to transport their products at different markets and purchase their inputs from other place for their business. This criterion is also sincerely considered before starting the construction of mega-projects in throughout the world (Vinokurov, Balas, & Michael Emerson, 2016). This cost is tried to keep minimum as much as possible to maximize the profit. For example, when *the White-Baltic Sea Canal* in Russia was planned to build form the White-Sea to the Baltic-Sea, it was evaluated on the three factor namely, *Transportation cost, strategic importance and logistics* (Morukov, 2004). Hence, both the routes have also been compared on transportation cost to keep the business cost minimum. A route would be more beneficial which has relatively less transportation cost because the lesser the transportation cost, the higher the profit one unit of investment earns. The distance of both the route from Karachi port has been taken and it has been used as proxy to estimate the transportation on both the routes.

The last criterion of this sub-objective is security cost. Here, security cost means, a cost, which the business individuals or companies have to pay to protect their businesses or industries when they start and run their businesses in insecure region. On this criterion, all the alternate places for a business are compared to find out the most peaceful place because, security issues charge price at very higher level. The most suitable example of this scenario is

terrorism in Pakistan. When terrorism wave started, many people had shifted their business at more secured places (Hyder & et.al, 2015). Hence, due to its sensitivity for the business and economic activities, this criterion has also been taken to inspect which out of two routes will be preferable with respect to security cost. The total number of terrorist attacks in one year has been used as proxy variable to estimate the security cost. A route, which has less number of terrorism attacks than second route in one year, will be more suitable route in term of security cost.

4.2.3 Minimizing Economic Disparity

The third sub-objective of economic section is to minimize economic disparity from the society. It is said that economic disparity is existed among the various parts of Pakistan. Even, in the world, the trade and economic corridor had tried to pass from those areas which are relatively more to reduce the economic disparity in the society (Shrestha & Chongvilaivan, 2013). Therefore, it has been selected as sub-objective of economic section. Now, this sub-objective has been broken down into four criteria namely, Unemployment, Earning Level and provision of basic Health and Education to inspect the economic disparity on both the routes.

First out of four criteria of this objective is Un-employment. This criterion means what is unemployment rate on both the routes of CPEC. Unemployment rate is world widely used to know the economic situation of any specific areas because if one person hasn't opportunity to earn for his basic needs of life, its means he lies at the lowest level of economic graph (Phyrum & et.al, 2007). Hence, due to its importance, unemployment rate has been taken to measure the economic disparity on both the routes. The data of unemployed individuals of one year has been used for this criterion. A route of CPEC, which has relatively more unemployment rate, will be more preferable for the route.

Second criterion is earning level in all the districts of each route of CPEC. It is also used as similar as unemployment rate is used to examine the economic disparity in throughout the world because both have direct link with the purchasing power of the people. The more the earning level, the higher the purchasing power of the people (Khetran, 2015). Hence, owing to its importance for economic disparity, it has also been taken as criterion in this study to investigate on which out of two routes of CPEC has more economic disparity. A route, which has more economic disparity, will be more suitable as compare to other route. Thus, the wages of employed individuals have been used as proxy to estimate earning level on both the routes of CPEC.

The third and fourth criteria are Basic Health Units and Schooling facility respectively which have been taken to measure the economic disparity in term of the provision of public facilities. This criterion has been included in this section for two reasons: firstly these two are much impropriate indicators of education and health which can be more effective to measure economic disparity in term of the provision of these public facilities. Secondly, these two criteria are used to find out optimal alternative of trade and economic corridor in various parts of world. The best example is the three corridors of Greater Mekong Subregion where these facilities have been used to find best out of all the available routes (Vinokurov, Balas, & Michael Emerson, 2016). By using the satisfaction level of local people, the provision of these public facilities has been examined on both eastern and western routes of CPEC. In this criterion, the lesser the satisfaction level on a route, the poor the provision of public facilities on that route exists. A route, which has relatively poor provision of public facilities, will be more preferable in term economic disparity.

4.2.4 Maximizing Trade

The Transit and Economic Corridors are built among multiple countries to improve regional trade and connectivity. These corridors are designed in such a way which can maximize the

trade volume among regional countries (Kudo, 2013). Due to the importance of corridors for trade, the last sub-objective is to maximize the trade of that country where the trade corridor passes. Thus, like other international corridors, this sub-objective has been taken in economic section to check which out of eastern and western route of CPEC would able to improve the trade of Pakistan. Now, this sub-objective has been broken down into four criteria such as like Road Congestion, Travel Distance, Industrial Congestion and International scope of the route.

First out of four criteria is Road Congestion. In this criterion, the road congestion means how many number of registered vehicles in the areas from where both the routes have been planned to build. Road congestion is kept in mind to find a route which has relatively safe, short, fast travelling. If trade corridors are built on already congested roads, it will reduce the travelling pace and bring more traffic accidents (Phyrum & et.al, 2007). Therefore, trade corridors are tried to build from less congested and shortest areas. Hence, it has been taken as criterion in the framework of this study to examine which out of two routes has less road congestion as compare to other. The total number of registered vehicles in all the districts of each route has been used as data for this criterion. A route, which has relatively less road congestion, will be more preferable route with respect to this criterion.

Second out of four criteria is Shorter Route. Here, shorter route means the total distance of both the routes of CEPC from their first district to last district. In various parts of the worlds, the trade and economic corridors are compared on the basis of their length in kilometer (Vinokurov, Balas, & Michael Emerson, 2016). This criterion remained very common for almost all the major corridors of the world because the lesser the length of a route, the fewer the transportation cost comes on that route. Therefore, owing to its importance, this criterion has also been taken in the framework of this study. The distance of both the routes has been

taken in kilometer to find out the shorter route. A route, which is more smaller in distance than second route, will be preferable in this criterion.

The third out of fourth criteria is industrial congestion. In this criterion, industrial congestion means the total number of industrial units registered in all the districts of each route. There is very strong relation between industries and trade corridors. Internationally, trade corridors are built from those areas where industries are relatively more deployed because it helps to improve the trade volume by connecting industrial hubs with local and regional markets (Kudo, 2013). Hence, in this study, this criterion has been taken to check on which route has more industries as compare to second route. The data of registered industrial units on both the routes has been utilized for this criterion. A route of CPEC, which has more industries than other, will be more suitable route as compare to its counterpart.

The last criterion of this sub-objective is the scope of internationalization of the routes. The scope of the route means how many landlocked countries a route of CPEC can attract for international trade. The scope of internationalization of a corridor is very imperative because the more the potential of internationalization, the higher the regional connectivity and trade takes place (Arvis & et.al, 2011). Therefore, this criterion has been included in the framework of this study to find out the route of a corridor that can connect maximum number of regional countries. The total number of landlocked on the side of each route of CPEC has been taken as data for this criterion. A route, which has more number of countries on its side, will have more potential to attract international trade and that route will also be preferable as compare to second route with respect to this criterion.

4.3 Social Section

The transit and economic corridors mostly become the reason of bring business and livelihood opportunities in their adjacent areas. These opportunities help to improve the life style of native people by their increasing income level. (Phyrum & et.al, 2007). Hence, in this

framework, one of the potential objectives of a mega-project is to bring social prosperity in the country. The least developed areas relatively require more economic and development activities which can provide them employment and public facilities (Haq & Farooq, 2016). Therefore, this type of areas are tried to prefer for the construction of mega-projects like Dams and Corridors (Dutta & Gupta, 2014). Now, this potential objective has been broken down into five criteria such as Pre-Natal Care, Sick and Injured, Literacy Rate, and Source of Drinking Water. All these criteria will be explained one by one.

The first criterion is percentage of sick and injured individuals. This criterion means the percentage of sick and injured individuals in all the districts of each route of CPEC. The second criterion of this section is percentage of pre-natal cases which means the percentage of all those individuals who took pre-natal care during pregnancy period. In the world, both these criteria are used to check the health status of the local people of any area (Phyrum & et.al, 2007). Owing to the importance of this criterion for health, they have been taken to examine the health status of the people who live on both routes of CPEC. The higher, the health one route, the better the social prosperity exist on that route of CPEC. The data of both the criteria have been taken in percentage. A route, which has more percentage of sick and injured persons, will be more preferable route in term of sick and injured criterion whereas a route, which has less percentage of pre-natal cases, will be more preferable in the criterion of pre-natal cares.

Third criterion is literacy rate which means the percentage of literate people on both the routes of CPEC. Education is very important factor that has been taken to check the social status of a society in term of literacy. On the basis of education, it is judged that how much the people of one area are enriched with education (Haq & Farooq, 2016). In education, the literacy rate is very common criterion that has been used to check the education level in a society. Hence, literacy rate has been taken to inspect the education level of the people of

both the route. A route, which has less literacy rate, will be more preferable than second route in term of education. The data of literacy rate for all the districts of each route has been used in this criterion.

The fourth criterion is housing ownership which the percentage of those people who live their own houses on both routes. The fifth criterion is the Sanitation which the percentage of those people who have sanitation facility in their houses on both eastern and western routes. These two criteria are used to check the living standards of the people of any society in term of their housing condition. For example these criteria are used in Pakistan Social Living and Measurement (PSLM) Survey to check the living standards of the people of each district of Pakistan with respect to housing. Thus, due to their importance, these two criteria have been included in the framework of this study to check the social status on both the route of CPEC. The data of both housing ownership and sanitation have been taken in percentage in this criterion. A route, which has less percentage of housing ownership and sanitation facility, will be more preferable route with respect to these two criteria.

The last criterion is The Source of Drinking Water. This criterion means the percentage of those people who have motor and hand pumps as the source of drinking water. This criterion is used to judge the living standards of the people at national level in Pakistan. The best example of this criterion is that it is used in Pakistan Social Living and Measurement Survey. Thus, it has also been used in this study to evaluate both the routes on this criterion. The data of the source of drinking water has been taken in percentage for this criterion. A route, which has less percentage of those people who have motor and hand pump for their drinking water, will be more preferable than other route.

4.4 Technological Section

It is speculated that when foreign investment comes in a country, it brings technology in its respective sectors as well. In addition, advance technology along with foreign investment is

more expected to come when some sectors are prioritized by providing preferential incentives under a specific project or program like economic and trade corridors. The more the potential of production in the sectors of a route, the higher the chance of attracting the latest technology along with investment of that route would have. Hence, the most potential production areas are selected to build the projects such as routes of CPEC, industrial Parks and routes of the corridors to ensure maximum technological advancement in these four sectors (F.Laurance & JeffreySayer, 2014). Therefore, in this section, the maximization of technological advancement in prioritized sectors has been taken as potential objective of the routes of CPEC. Further, this objective has been broken down into four sectors such Solar Energy, Agriculture, Horticulture and Mining to inspect their potential for attracting the latest technology from abroad.

First out of four sectors is solar energy in which the potential of solar energy production on both the route of CPEC has been taken as criterion to find out the most potential route with respect to this sector. In all over the world, when the production plants of solar energy are installed, all the alternate places are compared to examine which place has more potential of this sector and they are installed at most potential place (LingfeiWenga & KlintuniBoedhihartono, 2013). Thus, in this study, this sector has been taken to examine the most potential areas of solar energy because the higher the potential of solar energy on a route, the more the investment will come on that route. The data of the potential of solar energy per day on both the routes have been used for this criterion. A route, which had more potential of solar energy production, will be more preferable route than other route.

The second criterion is agriculture in which the potential of both the routes has been examined in term of agriculture production in one year of four major crops such as Wheat, Rice, Cotton and Sugarcane. The third criterion is Horticulture which means the fruit production on both the routes has been used to measure the potential of both eastern and

western routes. These two sectors are getting lot of importance for construction of trade corridors. For example, in Africa, “Growth Corridors” are being established in those areas which are very productive in agriculture and horticulture but due to lack of infrastructure, they aren’t connected with major markets. Hence, “Growth Corridors” brings integration between production fields and markets (LingfeiWenga & KlintuniBoedhihartono, 2013). Due to its worldwide importance of these two sectors, they have been taken in this study to examine the potential of these on both the routes. The production data of these two sectors have been taken for one year to compare both the routes. A route, which has more production in both agriculture and horticulture, will be more preferable as compare to its counterpart.

The last sector of technological section is mining in which both the route of CPEC will be compared on basis of its total production in one year. Mining is such sector which always remains important factor when the corridors are compared to find out the most suitable route of a corridor (Krongkaew, 2004). In Africa, “Growth Corridors” are being established in those areas which are very rich in minerals (Shrestha & Chongvilaivan, 2013). Hence, due to its importance, this criterion has also been used to compare the most potential route out of two routes by using the data of the production of mining in one year. A route, which has more production of mining, will be more capable to attract advance technology from the abroad.

4.5 Legal Section

In many research studies, it has been found that crimes negatively affect business and physical development such as trade corridors (Kumar, 2013). Crimes rate and economic growth is also negatively correlated to each another in Pakistan (Hyder & et.al, 2015). It can be said that the higher the crimes-rate, the lower the development activities take place in the country (Havi, 2014). Hence, due to the sensitivity of crimes for development, the potential objective of the route of CPEC has been taken in this section as to maximize the security of the routes. The security of the routes of CPEC would be maximized when it passes from

relatively more secured areas. Hence two types of crimes such as conventional crimes and non-conventional crimes have been taken to judge law and order situation both eastern and western routes.

First of two types is non-conventional. In this criterion, non-conventional crimes mean terrorism. Terrorism is such type of crime which has affected almost everywhere in the world with different intensity. But, it is unanimously considered as threat to economic activities like trade, investment and other businesses (Abadie & et.al, 2008). Therefore, it has been taken as criterion to check how much it can affect the routes of CPEC. By using the data of terrorist attacks in one year, the most secure route out of two routes will be found and a route, which has relatively less number of attacks, will be preferable as compare to second route.

Second type of crime is conventional crime. Here, conventional crimes mean all the crimes other than terrorism e.g. kidnapping and murder. The criteria of Murder Cases, Decoity Cases and Kidnapping have been taken to inspect the law and order situation on both the route in term of conventional crimes. In worldwide, conventional crimes are also considered harmful for economic and social development in the society (Kumar & et.al, 2017). Thus, these crimes have been taken to find out the most peaceful route of CPEC. The data on the number of crimes registered in one year on each route had used to compare both the routes. A route, which has relatively higher crimes rate, will be more preferable route than its counterpart.

4.6 Environment Section

In environment section, two types of potential objectives have been taken to evaluate both the routes of CPPEC: First out of them is to minimize the environment degradation during the construction of the routes. Second out of them is to minimize the environmental effects such as Rainfalls and floods on the routes of CPEC. Now, both the potential objectives will be explained separately in below content.

The first potential objective, which is to minimize the environmental effects on both the routes, is about the effects of physical development on environment. It has been taken to find out one such route of CPEC that can bring relatively less environmental cost. It is also a worldwide practice that the environmental cost of the mega-projects always analyzed before their construction (Maurer & Yu, 2016).. The projects of physical infrastructure such as Trade Corridor, Industrialization and Dams are finalized to construct at such places where they bring less environment degradation than all other alternatives (Amy & et.al, 2014). Now, this potential objective of this section has been broken down into two criteria such as Forestation and Population Density to find out the most of suitable route out two routes in term of environment degradation.

First criterion is population density in which population per square kilometer on both eastern and western routes has been taken to check on which out of the two routes has more population density as compare to other route. Population density is very much linked with environment because, when population increases in a specific area, it damages the environment in term of construction of houses, school, hospitals, and other commercial buildings (Karani, 2012). Therefore, in throughout the world, population density is used as criterion to use measure its effects on environment. Hence, it has also been included in this study as criterion to examine on which has more population density. A route, which has relatively less population density, will be more preferable with respect to this criterion. The data of population density has been used to find most preferable route on this criterion.

The second out of two criteria is Forestation in which the areas of both eastern and western routes of CPEC have compared to check on which side has less amount of forestation. Due to the importance of forestation for human life, it remains the most important concern of environmentalists about the construction of any mega-project like the routes of CPEC (Ishida, 2007). In throughout the world, it is tried to minimize the effects of physical infrastructure on

forestation (Amy & et.al, 2014). One of the ways to reduce these effects is that projects are built at such places where forestation is relatively less than all other available options. Hence, owing to the importance of forestation, forestation has been taken in this section to find out one such route that damages relatively minimum forestation on its side. The lesser the forestation on a route, the fewer the environment degradation takes place on that route. Hence, a route, which has relatively less forestation, will be more preferable as compare to second route.

In environmental section, the second potential objective of the routes of CPEC is to minimize the environmental effects on both the routes. This objective is about those environmental factors which can adversely affect the routes of CPEC. It has been taken to find out one such route of CPEC which can be relatively less affected by the environmental factors such as Rainfall, Floods and Earthquakes. In worldwide, these environmental factors are seriously considered before the construction of mega-projects like trade corridors and Road-Infrastructure (Sloan, 2015). The best example of this practice is Panama Canal where all the alternate routes of this canal has been compared on environmental factors and chosen the best out of all the available alternatives (Maurer & Yu, 2016). Hence, this objective has been broken down into three criteria such as Rainfall, Flood and Earthquake to evaluate both the route on this objective.

First out of three criteria is Flood in which the effects of flood on road-infrastructure have been examined. Floods are a very common challenge for physical infrastructure especially road-networking (Nemry & Demirel, 2012). It is severely presented in those countries where premature steps aren't taken for the construction of mega-project (Karani, 2012). Hence due to its sensitivity for roads, floods have also been used as criterion in this section to find out a route of CPEC which can be less affected by flood in future. A route, which has less danger of the damages of floods, will be more preferable route than second route of CPEC. The data

of the road-infrastructure damages in flood 2010 has been used in this criterion. This flood is considered the most dangerous flood in the history of Pakistan in term causalities and infrastructure damages. Therefore, its data has been taken for this criterion.

Weather mostly has significant effect on the construction and maintenance of projects like Corridors. Transportation system is more affected by factors like rainfall. In this section, rainfall has also been taken to inspect the environmental effects for all the alternatives of a project before starting its construction (Sloan, 2015). Earthquakes also adversely affect the route of corridors similar to all other physical infrastructure. This factor is seriously kept into mind before constructing the trade and economic corridors. For example, all the possible routes of Panama Canal were compared on earthquakes as well as many other factors (Maurer & Yu, 2016).

Chapter 5

Results and Analysis

As it has been stated in methodology chapter that M. MACBETH software has been utilized to estimate the results of this study. Now, in this chapter, both the routes of CPEC have been compared to each another on the basis of those results to find out the best route out of both eastern and western routes. By using the estimated results, the two routes have been evaluated in three ways:

1. Firstly, both eastern and western routes have been evaluated on the results of each criterion to check which route is more preferable than second route. For example the two routes have been compared based on "Number of Objections Raised by Provinces" under Political dimension.
2. Secondly, both the routes have been evaluated on the each section of the framework to find out the most suitable route out of two routes. For example eastern and western routes have been compared based on political and economic grounds.
3. Thirdly, both the routes have also been compared on the basis of aggregate result of all the criteria of the framework.

5.1 Political Section

First section of the framework is political which consists of two sub-criterions. In this section, the potential objective of the routes of CPEC is to maximize the political stability in the country. The criteria of "the number of objections raised by provinces" and "the number of wars fought with neighbor countries" have been used to examine which one out of two routes can be maximized this objective. Hence, when both the routes were evaluated, western route got higher score than eastern route in both the criteria. The cumulative weight of both the criteria for western routes is 0.106 points. Thus, the results show that western route is

more preferable than eastern route on political grounds. This comparison of the two routes has also been showed in diagram 5.1 below.

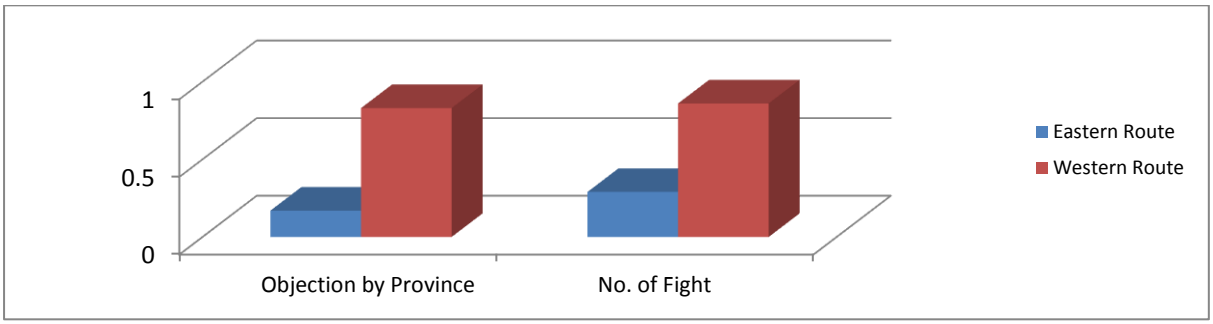


Diagram 5.1: All the Political Criteria

Now, the routes of CPEC have also been evaluated on each criterion of political section.

5.1.1 Numbers of Objections Raised by Provinces

In political section, first criterion is the number of objections raised by either provincial governments or political parties on the routes of CPEC. It has been used to investigate which route is more sensitive politically and which is less. Political sensitivity means a route which can bring more political instability than second route, if it isn't build. It was very imperative to take it as criterion because the routes of CPEC became a controversial subject between federal and provincial governments of Pakistan. Thus, the political sensitivity has been examined by using the data of numbers of major objections raised by provinces on the routes. The score of western route and eastern route is 0.83 and 0.17 points respectively which shows western route is more sensitive politically than eastern routes because the provincial governments and political parties of western side raised very serious objections on the routes whereas the provincial governments and political parties of eastern side didn't show any such objection on the routes.

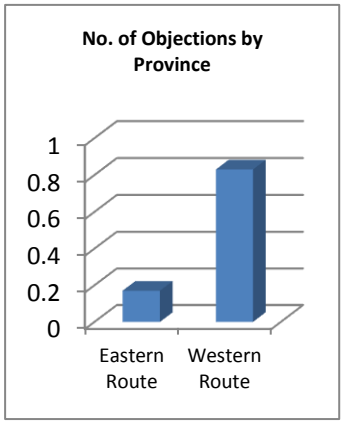


Diagram 5.2: No. of Objections

5.1.2 Number of Wars Fought

The second criterion of political section is number of wars fought between Pakistan and its neighbors. It has been taken to examine how much both the routes can be affected, if wars with neighbor countries take place. The data of wars which were fought between Pakistan and its neighbors' countries in past has been used in this criterion. The source of this data has been mentioned in Appendix (A) table A.2. Thus, the result indicates, western route is better than eastern route by 0.57 points in this criterion. It means western route is more secured than eastern route because no war was taken place yet between Pakistan and its western neighbors. But, Pakistan had to fight two major wars on western border from where eastern route has been planned to pass.

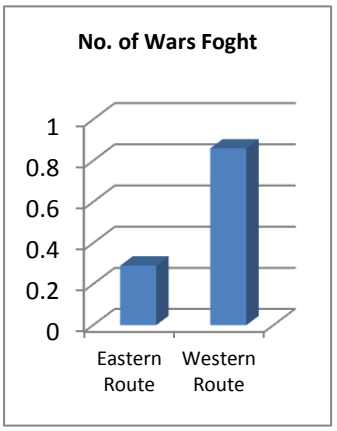


Diagram5.3: No. of Wars Fought

5.2 Economic Section

The potential objective of the routes of CPEC in term of economy is to maximize the sustainable economic growth in the country. In this section, seventeen criteria have been taken to check which out of two routes can maximized this objective. Hence, if both the routes are compared on economic section, 10 out total 15 criteria preferred western route whereas only 4 out 15 criteria supported eastern route for their construction. Western route is more suitable than eastern route in such criteria like as unemployment, the scope of route for international trade, road congestion, shortest route, agriculture land and availability of labor etc. On the other side, eastern route is better than western route in the criteria like industrial congestion, security cost and cost of labor etc. The accumulative weights of all the criteria of eastern and western routes are 0.195 and 0.419 points respectively. Thus, the results show, western route is better than eastern route with respect to economic criteria. This comparison of the routes has also been showed graphically in diagram 5.4 below.

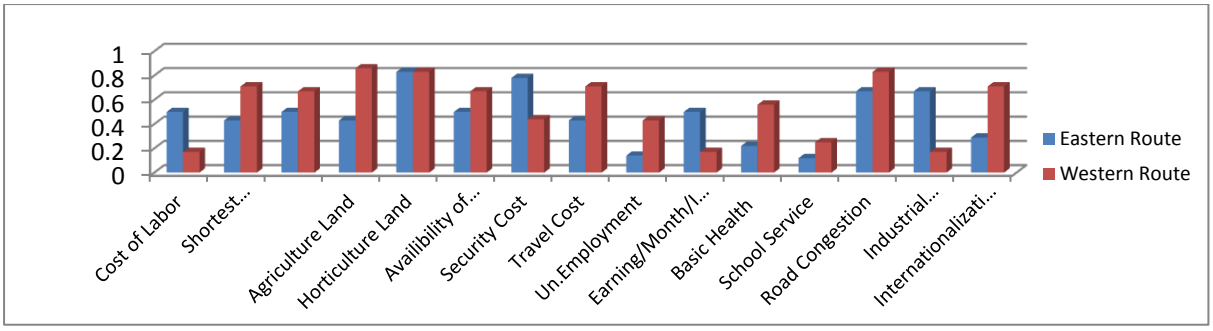


Diagram 5.4: All the Economic Criteria

After comparing both the routes on economic section as whole, now, these routes will also be evaluated on each criterion separately.

5.2.1 The Cost of Labor

The cost of labor is considered an important factor in the construction of projects, initiating and running business etc. Therefore, it has been opted to judge which route has more cheap labor than second route for the construction of routes and other projects. The wages of employed individuals in formal sector has been used as proxy to know the cost of labor on both the routes. The data of wages per month has been taken from source which has been presented in Appendix (A) table A.2. Thus, if both the routes are evaluated on this criterion, eastern route got higher score than western route by 0.34 points which shows, eastern route has more cheap labor than western route. So, according to the result of this criterion, eastern route is more preferable than western route in term of cost of labor.

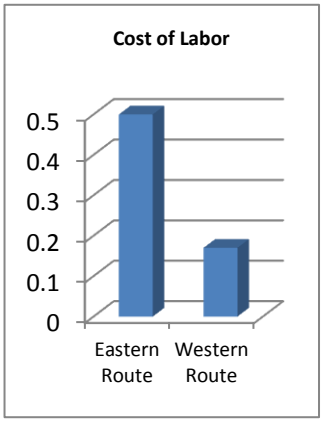


Diagram 5.5: Cost of Labor

5.2.2 Shortest Route

Travelling distance can be an essential factor in the construction of a project in term of the transportation of inputs and labor etc. The shorter the distance of a route, the fewer the cost of transportation would occur on that route. Therefore, this criterion has been taken to find out the shorter route out of two routes.

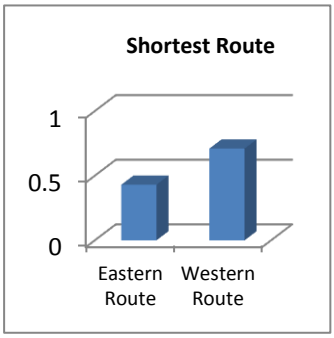


Diagram 5.6: Short Route

The distance of both the routes from Karachi port has been taken to find out the shortest route which would provide the smallest access till Karachi port to get the inputs and raw-material for the construction on both the routes. The source of data has also been mention in Appendix (A) table A.2. Thus, the result shows western route is shorter route than eastern route because it has high score than eastern route by 0.28 points.

5.2.3 Destruction Cost of Physical Infrastructure

When any mega-project like road-infrastructure are started to build in already built-up areas, the destruction cost of physical infrastructure like houses and commercial buildings come into being. The routes of CPEC are very long routes which have been proposed to pass near to or from the built-up areas at many places. Therefore, destruction cost is also expected to come when both these routes would be built. It would be higher in those districts where built-up areas is large than the districts where it is small. Hence, the total built up area on both routes has been taken as proxy variable to inspect on which route destruction cost would be higher than other. The source of data of built-up area has been presented in Appendix (A) table A.2. The result of this study indicates, western route is more suitable than eastern route by 0.12 points which means on western route, built-up area is less than eastern route.

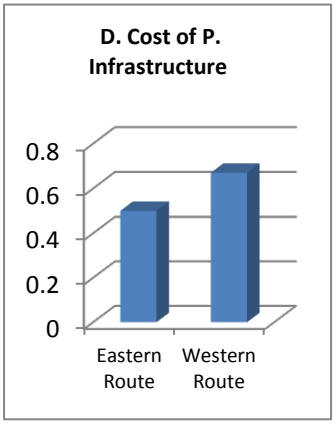


Diagram 5.7: Destruction Cost

5.2.4 Agriculture Land

Agriculture land has been taken to assess which one out of two routes would take more agriculture areas for its construction. It was an essential because the more the agriculture land one route takes, higher the opportunity cost would come on that route. Thus, the data of agriculture land of four major crops Wheat, Cotton, Rice and sugarcane has been used to inspect which route out of two has more agriculture land. The source of the data has also been

mentioned in Appendix (A) table A.2. In this criterion, higher score of a route means it would take less agriculture land than its counterpart. The result shows, western route got higher score than eastern route by 0.43 points. It means, western route would bring less opportunity cost in term of agriculture land as compare to eastern route.

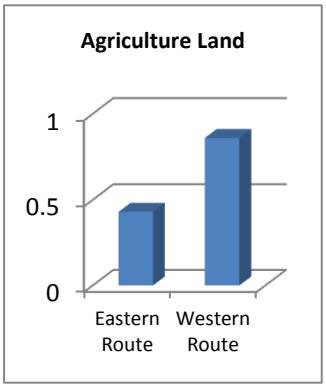


Diagram 5.8: Agriculture Land

5.2.5 Horticulture Land

The criterion of horticulture land has also been included in the framework because Pakistan is not only an agriculture country but it produces many types of fruits at large scale. Hence, it was imperative to inspect, how much horticulture land will be taken by both the routes in their respective districts. The more the horticulture land present on a route, the higher the opportunity cost would occur on that route. The data of total horticulture land in hectares has been taken to judge which one out of two routes would take more horticulture land. The data source of horticulture land has been cited in Appendix (A) table A.2. Now, by comparing the two routes on horticulture land, both the routes have got same score by 0.83 points. It means both the routes would take same amount of horticulture land for their construction because the area of horticulture land is approximately same on eastern as well as western alignment.

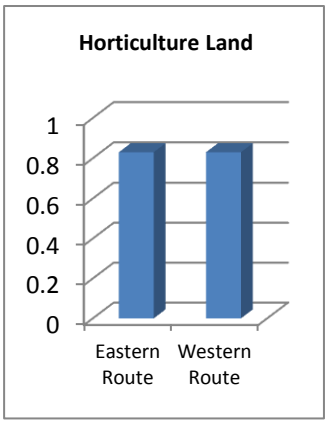


Diagram 5.9 Horticulture Land

5.2.6 Availability of Labor Force

Availability of labor is an essential factor of production. Thus, it has been included in the framework to find a route on which availability of labor force is higher than second route. Labor force participation rate has been taken as proxy variable to check the availability of labor force on both routes. The data of labor force participation has been used in this criterion

whereas source of data of this has also been mentioned in Appendix (A) table A.2. When both the routes were compared on the force participation rate, western route was found more suitable as compare to eastern route because western route labor has higher score than eastern route by 0.10 point.

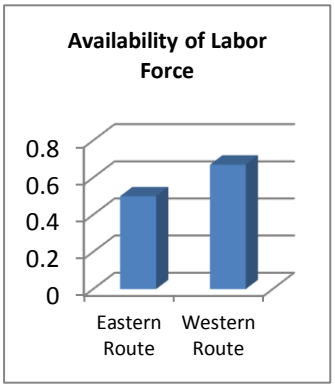


Diagram 5.10: Labor Force

5.2.7 Security Cost

In those countries, where terrorism is relatively higher than rest of the world, security cost is seriously considered as business cost by the domestic and international business community. Higher security costs always discourage the business activities. Therefore, it was important to inspect on which route out of two routes security cost would be higher. The more the terrorist attacks, the higher the security cost occurs on a route. In this criterion, the number of terrorist attacks per year has been used as proxy variable to know the expected security cost on both the routes. The data of terrorist attacks per year on both the routes has been utilized and the source of data has also been cited in Appendix (A) table A.2. The result indicates eastern route is better than western route by 0.33 points which implies it is more secured route and it would have less security cost than western route.

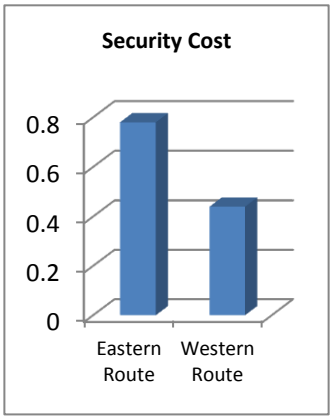


Diagram 5.11: Security Cost

5.2.8 Transportation Cost

Transportation cost is not only an essential factor in the construction of new projects but it is also important in initiating and running businesses. Therefore, it was imperative to find the least expensive route in term of transportation cost for all type of business. Hence, travelling distance has been taken as a proxy to know the transportation cost on both the routes. The data of

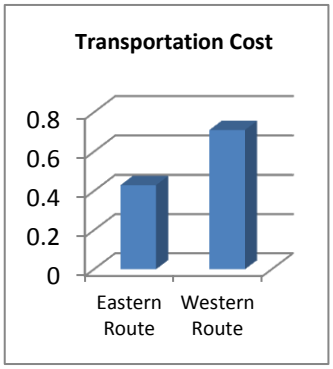


Diagram 5.12: Travel Cost

distance has been taken in kilometers whereas the source of this data has been mentioned in Appendix (A) table A.2. The result shows western route is more preferable than eastern route because it got higher score as compare to eastern route by 0.28 points. Here, higher score means western route would have less travel cost as compare to its opponent route.

5.2.9 Un-Employment Rate

Unemployment rate has been taken to examine the economic disparity of local people lived on both the routes. It has been included in the framework because in such areas, where economic situation is relatively poor, need to be given more economic activities as compare to those areas where economic situation is relatively good. The data of unemployment rate in one year has been used and the source of this data has also been presented in Appendix (A) table A.2. The result of un-employment shows western route is more preferable than eastern route by 0.29 points because it has more un-employment than eastern route.

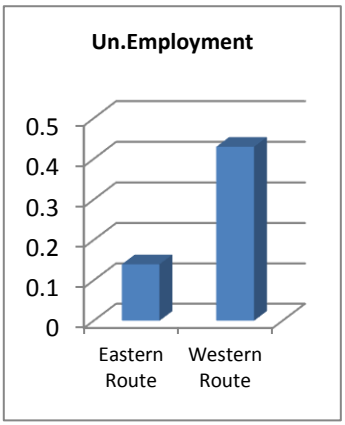


Diagram 5.13: Un-Employment

5.2.10 Earning per Month per Individual

In economic section, Monthly earning has been taken to investigate on which route the earning level of employed people is relatively low. It was very imperative because less earning districts of one route need to be given more economic activities as compare to high earning districts of second to eliminate the economic disparity. In the criterion, the data of the monthly earning of employed individuals has been utilized and the route source of this data has been cited in Appendix (A) table A.2. Thus, when both the routes were compared on this criterion, eastern route got higher score as compare to its counterpart which

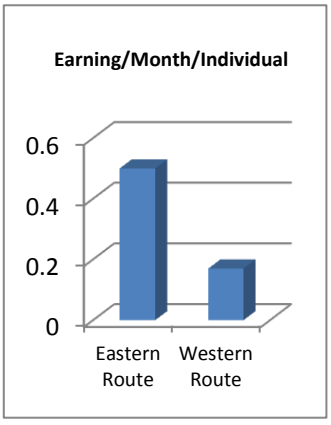


Diagram 5.14 Earning/Month

implies, on average, the employed people lived on eastern route earned less than the employed people lived on western route.

5.2.11 Basic Health Units

Few basic public facilities have also been included as the criteria to know the economic disparity of the people lived on the two routes. Basic Health Units is one of those facilities which have been taken to evaluate both the routes. The people satisfaction has been used as proxy variable to check the provision of Basic Health Units facility. The data of people satisfaction about the provision of Basic Health Units has been used whereas the source of this data has also been mentioned in Appendix (A) table A.2. Thus, the result of this criterion indicates that western route has higher score than eastern route by 0.34 points which means the people of western route have poor Basic health Units facility as compare to the people of eastern route. So, this criterion preferred western route for the construction because the more the availability of infrastructure, the better the provision of public facilities.

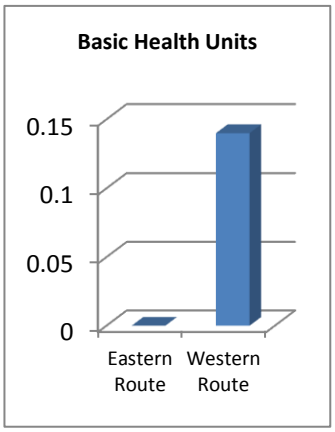


Diagram 5.15: Basic Health Units

5.2.12 School Service

By comparing both the routes on school service, the most neglected areas have been tried to find in term of the provision of this facility. The areas, where schooling facility is relatively less available, are required more development like corridors than the areas where schooling facility is relatively more available to reduce the sense of deprivation. It will also help to improve the provision of public facilities by providing better road-infrastructure. The data of the people satisfaction has been used to inspect the provision of Schooling facility and the source of data has been presented in Appendix (A) table A.2. According to

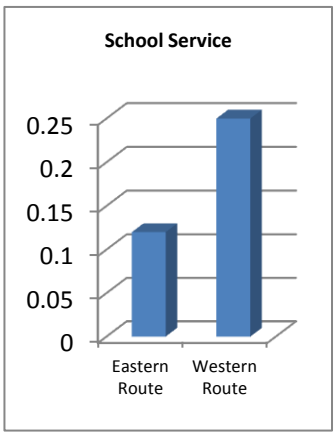


Diagram 5.16: School Service

the result of this criterion, western route got higher score as compare to eastern route by 0.13 points which means the school service on western route is inferior to eastern route. Therefore, western route is more preferable than eastern route with respect to this criterion.

5.2.13 Road Congestion

Roads can be very essential factor to improve the trade activity in Pakistan because a big chunk of domestic trade is done by using road-networking. Road congestion is one of those factors that can adversely affect the transportation of trade. Therefore, this criterion has been used to examine which out of two routes is less congested because it will help to ensure more secure and fast travelling. The numbers of registered vehicles per square kilometer in all the districts of each route has been taken as data in this criterion and its source has also been presented in Appendix (A) table A.2. The result of this criterion shows western route is less congested than eastern route because it has higher score by 0.14 points.

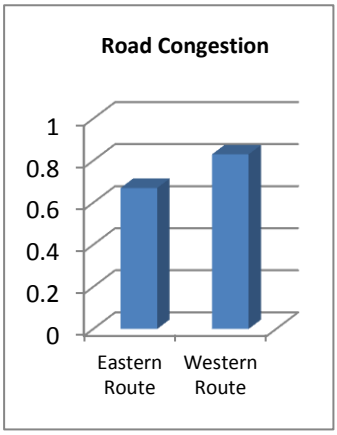


Diagram 5.17: Road Congestion

5.2.14 Industrial Congestion

Industrialization is another important factor that can significantly help to improve the net-trade of Pakistan. But, without having proper road-linkages among Markets, Industrial hubs and Sea-Ports, these industries can't play its full role to increase net-trade of any country. A route would be more suitable which pass from those areas where more industries are located because that route would able to connect more industries with ports and markets. Therefore, Industrial congestion has been taken as criterion to check on which out of two routes have more industrial units than second route. The data of industrial units registered per district has been used to check the industrial congestion on each route and the source of the

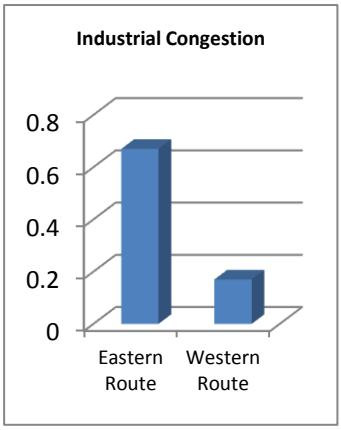


Diagram 5.18: Industrial Congestion

data has also been mentioned in Appendix (A) table A.2. The result shows, eastern route got high score than western route by 0.57 points which means it has more industrial units and it is more preferable as compare to its opponent route.

5.2.15 Internationalization of the Route

The utility of CPEC can be manifold if its routes are used for trade by landlocked neighboring countries of Pakistan whereas these routes have potential to provide them access till sea-port. But, it was required to check which route of CPEC is more capable to attract the trade of landlocked countries. Thus, this criterion has been taken to examine the scope of internationalization of both the routes of CPEC. The number of landlocked countries on both routes has been taken as proxy variable to examine the potential of both the routes for attracting international trade. The source of data has been presented in Appendix (A) table A.2. Thus, when the two routes were evaluated on this criterion, western route got more score than eastern routes by 0.42 points which implies western route has more potential of internal trade as compare to eastern route.

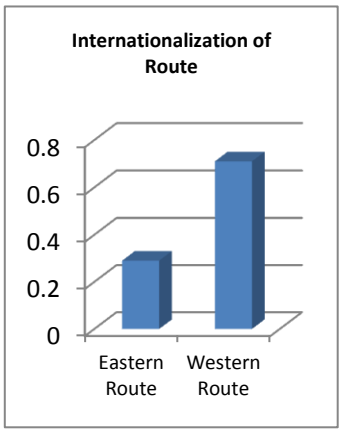


Diagram 5.19: International Scope

5.3 Social Section

In this section, the potential objective of the routes of CPEC is to improve the social status of the local people. Thus, the route of those areas, where social life is relatively poor, are tried to prefer than other route to ensure social prosperity on equal basis. Now, the criteria like Housing-Ownership and Literacy Rate have been opted to compare the social status of the people of both the routes. These criteria have been divided into three sub-sections, Health Facility, Education Level and Living Standards. Thus, the results of social section show that western route is more preferable than eastern route, in four out of six criteria namely, Pre-Natal Care, Literacy Rate, Source of Drinking Water and Sanitation. On the other hand,

eastern route is better than western route in rest of two criteria. The accumulative weights of all the criteria of eastern and western routes are 0.035 and 0.075 points respectively. This comparison between both the route has also been graphically in Diagram 5.20 below.

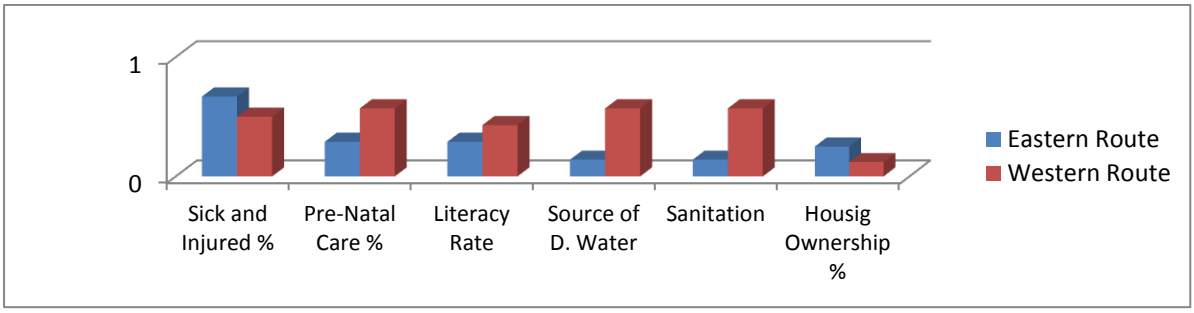


Diagram 5.20: All the Social Criteria

Here, both eastern and western routes have been evaluated on every criterion of the social section separately.

5.3.1 Sick and Injured (%)

The criterion of sick and injured has been included to check the health status of the natives lived on both the routes. The higher percentage of sick and injured can be for two reasons: firstly, people haven't enough provision of public health services like hospitals. Secondly, they can't afford treatment in private hospital due to financial constraints. Hence, the higher the percentage of sick and injured on one route, the more the economic and infrastructure development on that route is required because it will help to improve the income level and provide road-infrastructure for the provision of health services by the government. The data of the percentage share of sick and injured out of total population has been utilized for this criterion whereas the source of this data has been presented in Appendix (A) table A.2. The result of this criterion shows, western route has higher score than eastern route by 0.12 points which means it has more percentage of sick

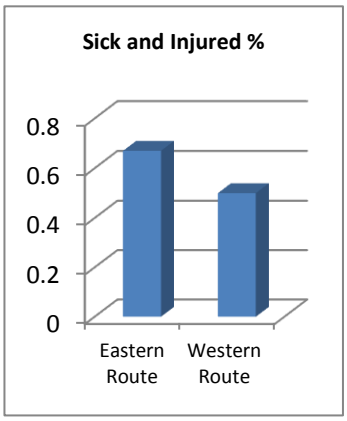


Diagram 5.21: Sick and Injured

and injured individuals than western route. Hence, eastern route is more preferable than western route with respect to this criterion.

5.3.2 Pre-Natal Care

The second criterion of social section is the percentage of those individuals who got pre-natal care during their pregnancy. It has also included in the framework to know the health status of local people. The less percentage of pre-natal care can also be for two reasons: firstly, people haven't enough provision of public health services like hospitals. Secondly, owing to financial constraints, they can't afford the expense of treatment in private hospital. The fewer the percentage of pre-natal care on one route, the more the economic and infrastructure development on that route is required because it will help to improve the income level of natives and provide road-infrastructure for the provision of health services by the government. The data of Pre-Natal Care has been used in percentage and the source of data has been mentioned in Appendix (A) table A.2. If the two routes of CPEC are compared on this criterion, western route got higher score than eastern route by 0.28 points which shows the people who live in the areas of western route got less pre-natal care than the people who live in the areas of eastern route. It shows western route is more eligible than eastern against this criterion.

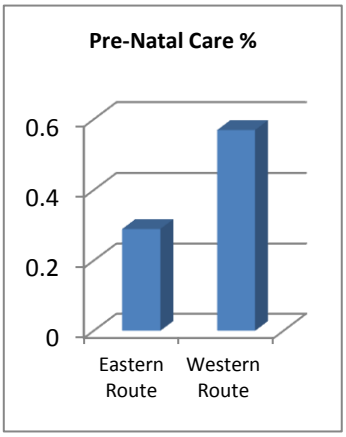


Diagram 5.22: Pre-Natal Care

5.3.3 Literacy Rate

In social section, education level is another factor which has been opted to judge the social status of those people who live on both the routes of CPEC. In this study, the higher the education level means the better the social status of the local people. Hence, literacy rate has been taken as proxy variable to judge the education

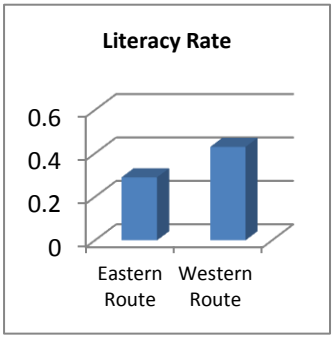


Diagram 5.23: Literacy Rate

level in all the districts of eastern and western routes. By using the data of literacy rate, both the routes have been evaluated and the source of this data has also been presented in Appendix (A) table A.2. After the evaluation of both the routes, the result shows, western route got higher score as compare to eastern route by 0.14 points which means it has less literacy rate than eastern route. Therefore, the western route is more preferable as compare to its opponent route.

5.3.4 Source of Drinking Water (%)

The source of drinking water has been taken as a criterion to judge the living standard of local people who live on both the route. The data of the source of drinking water has been used in percentage whereas its source has been presented in Appendix (A) table A.2. This result of this criterion shows, western route got higher score as compare to eastern route by 0.43 points which means western route has less percentage of those people who have motor and hand pumps to get water for their drinking needs. They have to go for other poor source of water to get water for drinking. So, according to the result, western route is more demanded as compare to eastern with respect to this criterion.

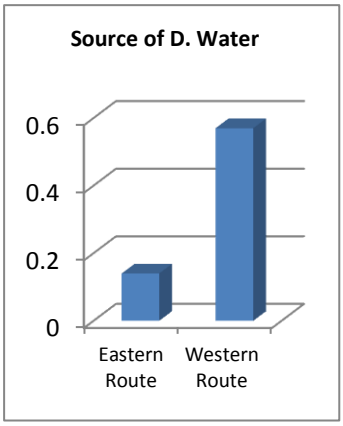


Diagram 5.24: Drinking Water

5.3.5 The Availability of Sanitation (%)

Sanitation has also been opted to examine the living standards of local people of both the routes. By using the data of sanitation, it has been examined that how many people on both the routes have sanitation facility at their houses. The source of the data of sanitation facility has been presented in Appendix (A) table A.2. The result reveals that western route got much higher score as compare to eastern route by 0.43 points which

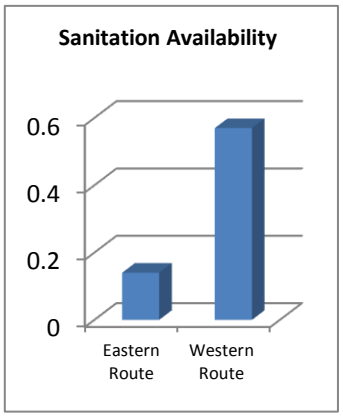


Diagram 5.25: Sanitation

implies the people of western route have less sanitation facility as compare to the people of eastern route. Therefore, western route is needed to build on priority basis with respect to sanitation facility.

5.3.6 Housing Ownership (%)

Housing ownership can be a very important factor to judge the living standards of the local people because shelter is one of very basic needs of human life. The data of those individuals, who live in their own houses, has been taken to check status of housing ownership on both routes and the source of data have also been mentioned in Appendix (A) table A.2. When both the routes were compared on this criterion, the eastern route got more score than western route. Thus, the result indicates that the percentage of housing ownership on eastern route is less than the percentage of housing ownership on western route. Therefore, eastern route is more preferable than western route against this criterion.

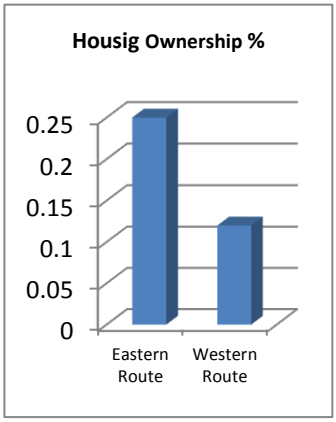


Diagram 5.26: Housing Ownership

5.4 Technological Section

Another potential objective of CPEC, which has been taken in this section, is to ensure maximum technological advancement in the country. On both eastern and western routes, there are many sectors such as Agriculture which have potential to attract foreign investors toward them. These investors can bring advance technology along with investment, if government prioritizes those sectors for investment of CPEC. Hence, technological advancement can be taken place in Pakistan by attracting foreign investors in major sectors like agriculture, Mining and Energy etc. Now, on the basis of four major sectors Agriculture, Horticulture, Mining and Energy, both the routes have been compared to judge which route out of two routes has more potential to attract advance technology along with investment. Thus, the result shows, eastern route is more significant than western route because three out

of four sectors preferred it over western route. The accumulative weights of eastern and western route are 0.039 and 0.010 points respectively. This comparison has also been showed in Diagram No.5.27 below.

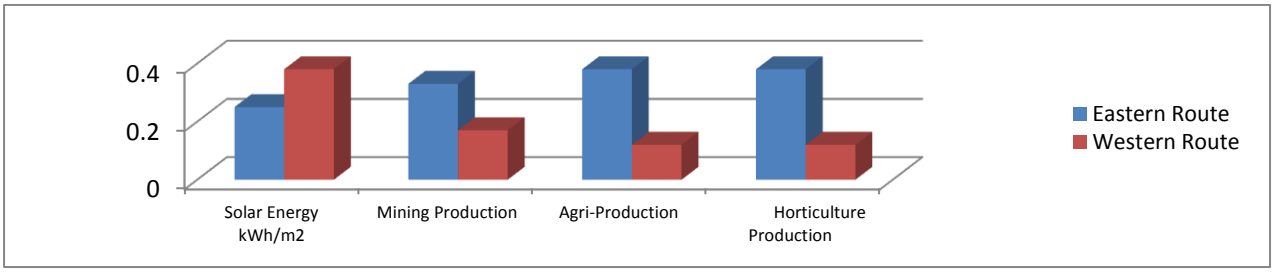


Diagram 5.27: All the technological criteria

5.4.1 Potential of Solar Energy Production kWh/day/m2

The solar energy production has been taken to check which route would have more potential to attract foreign investment, if this sector is prioritized for the investment of CPEC. It was important to inspect because the higher the potential of a route, the more the technology and investment it can attract. The data of the potential of solar energy production kWh/day/m2 on both the routes has been used for this criterion whereas the source of this data has been presented in Appendix (A) table A.2. The result indicates that western route has higher score as compare to it counterpart by 0.13 points. It means western route has more potential of solar energy production and it also has more potential to attract advance technology as well as investment as compare to other route

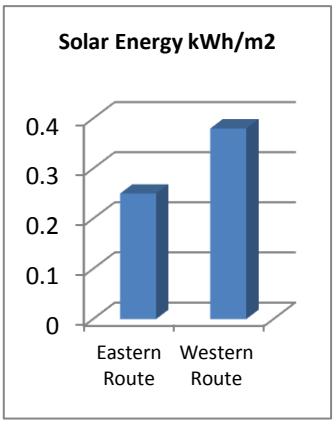


Diagram 5.28: Solar Energy

5.4.2 Mining Production/Year (Tonnes)

Mining sector has been taken to inspect that which route has more annual production of mining. A route, which has more mining production, would be more suitable with respect to this criterion because the more the annual production, the higher the potential of a route for attracting technology and investment from abroad.

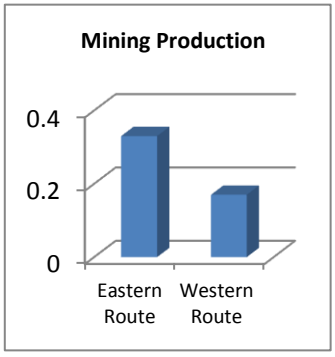


Diagram 5.29: Mining Production

In this criterion, the data of annual mining production has been used whereas its source has also been mentioned in Appendix (A) table A.2. The result of mining production indicates that eastern route got higher score as compare to western route by 0.16 points. It means eastern route has more annual production of mining than its opponent route. Therefore, it has more suitable for the investment.

5.4.3 Agriculture Production/Year (Tonnes)

The routes of CPEC have also been compared on agriculture sector. In this criterion, the total agriculture production of four major crops namely, Wheat, Rice, Sugarcane and Cotton in one year has been taken to know which route has more potential to attract advance technology from abroad, if agriculture sector is prioritized in CPEC. The data of these four crops on both the routes has been used and the source of the data has also been presented in Appendix (A) table A.2. Thus, when both the routes were evaluated on this sector, eastern route is better than western route by 0.26 points which means it has more annual production of agriculture than western route. Thus, the result shows eastern route is more preferable than western route with respect to agriculture production.

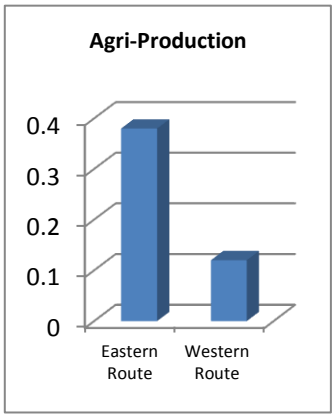


Diagram 5.30: Agri-Production

5.4.4 Horticulture Production/Year (Tonnes)

Horticulture is another very significant sector that can be very attractive for the foreign investment because Pakistan has lot of potential in this sector as well. Therefore, the total production of horticulture in one year has been used to know the potential of this sector on both the routes to attract advance technology along with investment. The data of horticulture production has been used to evaluate both the routes and its source has also been

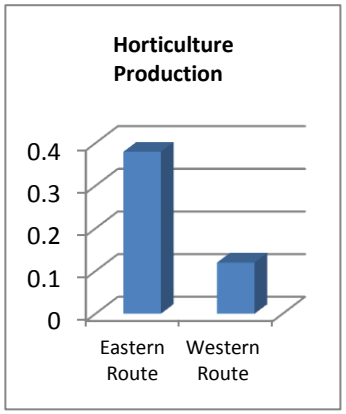


Diagram 5.31:Fruit Production

mentioned in Appendix (A) table A.2. When both the routes were compared on this criterion, eastern route got more score than western route by 0.16 points that implies eastern route has more production of horticulture. Thus, the result reveals eastern route has more potential to attract investment than its counterpart

5.5 Legal Section

In legal section, both the routes of CPEC have been compared on the basis of conventional and non-conventional crime to inspect law and order situation. In this criterion, non-conventional crime mean terrorism and all the crimes other than terrorism means conventional crimes e.g. Murder and Kidnapping. It was very imperative because, crimes like terrorism, decoities and kidnapping have negative effects on the trade routes. It is also potential objective of CPEC that the security of the routes should be maximized and it would be maximized when the routes pass from the most secured areas. Four criteria such as Terrorism, Murder Cases/Year, Decoity Cases/Year and Kidnapping Cases/Year have been taken to inspect which route is more secured than other route. Now, if both the routes are compared on these criteria, western route has better law and order situation as compare to eastern route. Hence, the results of this section show, all the criteria of crimes except terrorism are in favor of western route and their accumulative weight is 0.023. One out four criteria which is terrorism preferred eastern route instead of western route. The comparison of both the routes has also been showed graphically in diagram 5.32 below.

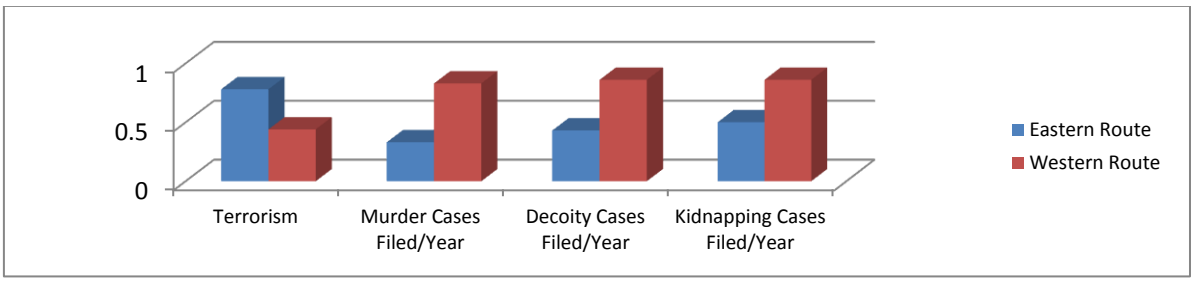


Diagram 5.32: All the Legal Criteria

5.5.1 Terrorism

First criterion of legal section is terrorism. The total numbers of terrorist attacks in one year have been taken to check the intensity of terrorism on both the routes. The source of this data has also been mention in Appendix (A) table A.2. Larger number of terrorist events in a given regions shows more unrest in the region. The preferred region would be the one where there is less number of events. By assessing these routes on terrorism, eastern route was found better than western route because it got higher score as compare to western route by 0.33 points. In this criterion, higher score means less number of attacks and small score means more number of attacks has been carried out on a route. Thus, the result shows eastern route is more preferable over western route because the districts of western routes are more affected by terrorism than the districts of eastern route.

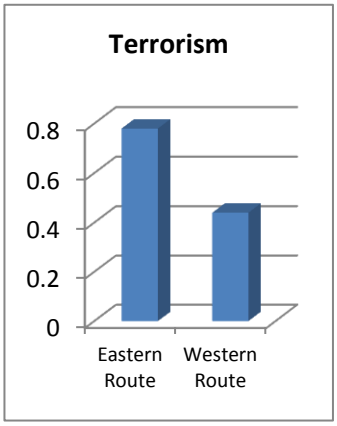


Diagram 5.33: Terrorism

5.5.2 Murder Cases Filed/Year

The second criterion of legal section is Murder cases Filed/Year which has been taken to check the law and order situation on both the routes. The total numbers of Murder Cases Filed in one year in all the districts of each route has been used as data in this criterion and the source of data has also been mentioned in Appendix (A) table A.2. When the two routes were compared, western route got higher score as compare to eastern route by 0.50 points which means the law and order situation is far better on western route as compare to eastern route. Thus, the result shows, western route is more preferable than eastern route with respect to this criterion.

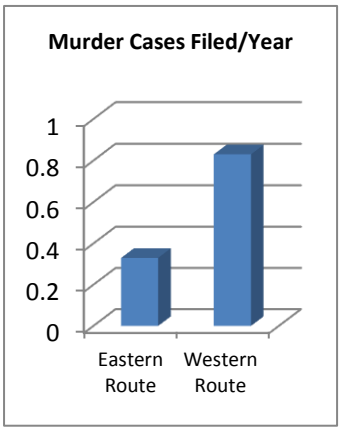


Diagram 5.34: Murder Cases

5.5.3 Decoity Cases Filed/Year

Decoity cases Filed /year is another criterion of legal section which has been used to examine the crimes rate on both the routes with respect to this data. The data of decoity cases filed in one year in all the districts on each route have been used in this criterion whereas the source of this data has been presented in Appendix (A) table A.2. The result indicates that, western route got higher score as compare to eastern route by 0.43 points which implies western route has less decoity cases than eastern route. Therefore, according to the result, it is relatively more secured and preferable route.

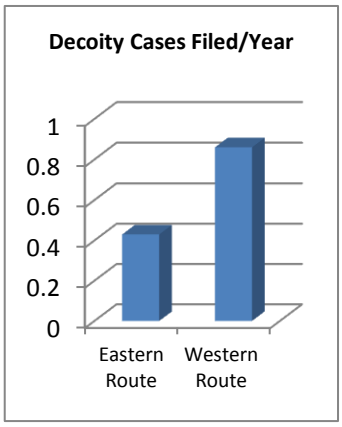


Diagram 5.35: Decoity Cases

5.5.4 Kidnapping Cases Filed/Year

The third criterion of legal section is kidnapping cases/year which has been taken to know the law and order situation on both the routes. The data of kidnapping cases filed in one year on both routes have been used in this criterion whereas the source of this data has been mentioned in Appendix (A) table A.2. If both the routes are compared on this criterion, western route is again far better than eastern route because it got higher score as compare to eastern route. The results shows, the score of western route is 0.86 points which is 0.36 points higher than the score of eastern route. It means, western route has better law and situation as compare to its counterpart with respect to this criterion.

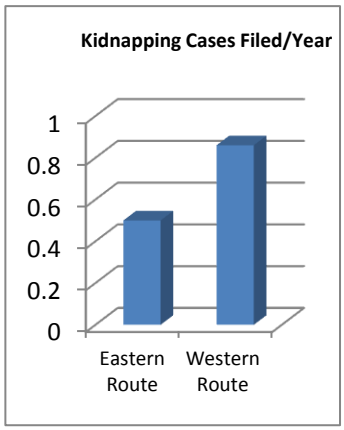


Diagram 5.36: Kidnapping Cases

5.6 Environment Section

In environment section, the two potential objectives of the routes of CPEC have been taken to compare these routes with each another: First of them is to minimize the environment degradation and second of them is to minimize the environmental effects on the routes and

other projects of CPEC. Five criteria such as Population Density, Forestation, Floods, Rainfall and Earthquakes, have been selected to check which out of two routes can achieve these objective at maximum level. Thus, population density and forestation have been taken to know the effect of routes on environment whereas Floods, Rainfall and Earthquakes have been taken to inspect how these factors can affect the routes of CPEC. If both the routes are compared on environment factors, three out of total five criteria are in favor of western route whereas rest of two are in favor of eastern route. The accumulative weights of all the criteria of eastern and western routes are 0.004 and 0.010 points respectively. This comparison has also been showed graphically in Figure 5.37 below.

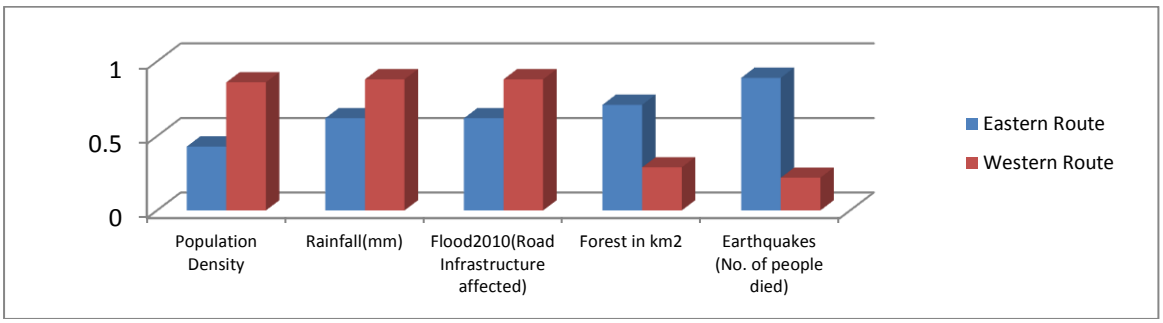


Diagram 5.37: All the Environmental Criteria

5.6.1 Population Density

Most of time, the densely populated areas more negatively affect the environment as compare to the thinly populated areas. If a route is built from already congested areas, it will further increase the population density in those areas. Thus, in this section, this criterion has been included to find out a route of CPEC where population density is relatively less than other route. The data of population density on each route has been used in this criterion and its source has also been presented in Appendix (A) table A.2. The comparison of both the route shows, western route is more suitable for CPEC as compare to eastern route with respect to population congestion because it has more score than eastern

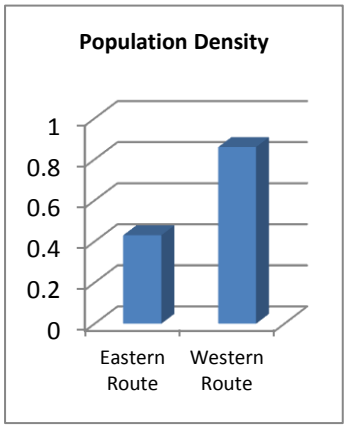


Diagram 5.38: Population Density

route by 0.43 points. Thus, the result shows, the areas of western route is least populated than the areas of eastern route.

5.6.2 Forestation in km2

When physical development takes place, it adversely affects forestation in respective areas. Thus, in this section, the total areas of forestation on both the routes have been used as proxy to examine the effect of these routes on the forestation. The data of forestation has been taken in square kilometers whereas its source has also been mentioned in Appendix (A) table A.2. By evaluating both the routes on forestation, the result reveals that eastern route got high score as compare to western route by 0.42 points. It means eastern route has less forestation than western route and it would damage less forestation as compare to its opponent route.

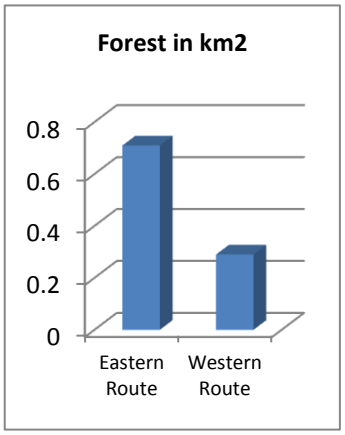


Diagram 5.39: Forestation

5.6.3 Rainfall (mm)/Year

Rainfall is one of those environmental factors that can affect road-infrastructure. Therefore, it has been taken as a criterion to assess how excessive amount of rainfall can affect the routes of CPEC. The data on rainfall has been utilized to evaluate both the routes on this criterion and the source of data has also been presented in Appendix (A) table A.2. Now, if both the routes are compared on this criterion, western route is more preferable than eastern route because western route has higher score as compare to its counterpart by 0.26 points. Is implies western route has less rainfall than eastern route of the corridor.

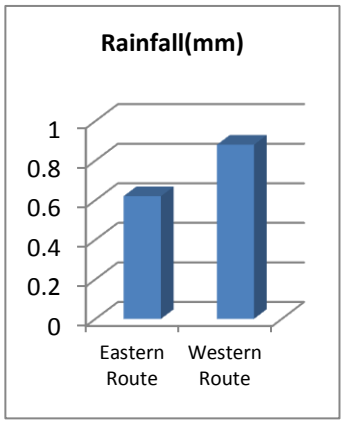


Diagram 5.40: Rainfall (mm)

5.6.4 Flood 2010

Flood is another significant factor which can adversely affect road-infrastructure. Thus, the data on the damages of Road Infrastructure in flood 2010 has been used to find out how both the route of CPEC can be affected by the floods in future. The source of this data has also been presented in Appendix (A) table A.2. The result of this criterion shows western route is more preferable than eastern route because the areas of western route are relatively less affected by flood as compare to the areas of eastern route. The score of western route is better than the eastern route by 0.26 points.

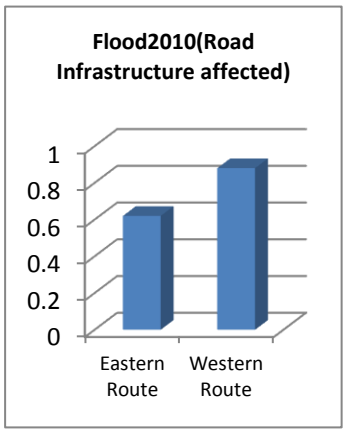


Diagram 5.41: Road Damages

5.6.5 Earthquakes

Earthquakes adversely affect the road-infrastructure especially in those areas where its intensity is relatively higher. Many times in Pakistan, earthquakes damaged the road-network at very large scale. Due to its sensitivity, earthquakes have been included in the framework to investigate how much it can affect both the routes of CPEC. The data of causalities in last four earthquakes has been used for this criterion and the source of this data has been mentioned in Appendix (A) table A.2. When both the routes were evaluated on this criterion, eastern route got more score than western route by 0.67 point. It shows, eastern route is less sensitive to earthquakes as compared to western route

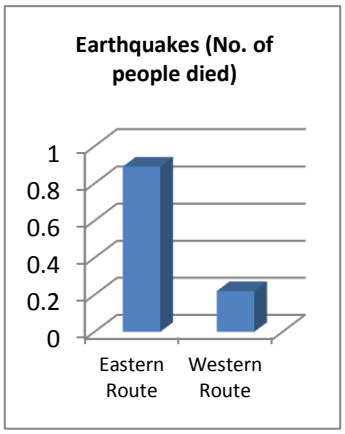


Diagram 5.42: Earthquakes Damages

5.7 Overall Result

The comprehensive framework is based on 38 sub-criteria. On the basis of these criteria, both the routes have been compared to each another. All the results have been calculated by the software within 0-1 scale therefore the score of both the routes lies between zero and one.

Eastern route has got 0.44 points whereas western route has got 0.55points in overall score. So, western route has higher score than eastern route by 0.11 points. Thus, the aggregate result of comprehensive framework shows that western route is more preferable than the eastern route of CPEC. The overall score of both the routes and the scores of all the criteria have been placed in *Appendix (B) Tables B.2, B.3, B.4, B.5, B.6, B.7, B.8.* The comparison of both the routes on the basis of all the criteria have also been showed graphically in diagram B.1 in Appendix (B).

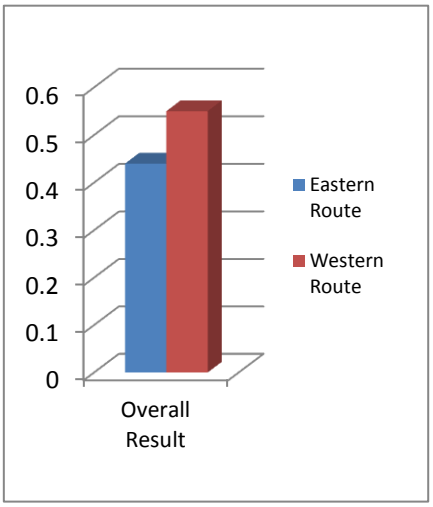


Diagram 5.43: Overall Result

Up till now, both the routes have been compared on the basis of overall result of comprehensive framework. Now, both the routes of CPEC have been compared on the number of criteria that how many criteria are in favor of western route and how many criteria are in favor of eastern route. Thus, western route is not only preferable on the basis of aggregate score but 25 out of total 38 criteria are in favor of this route. This comparison has also been graphically showed in diagram 5.44 below.

On the other side, 13 out of 38 criteria are those in which the eastern route is better than the western route of CPEC. The criteria, which preferred eastern route over western route, have been showed graphically in diagram 5.45 below.

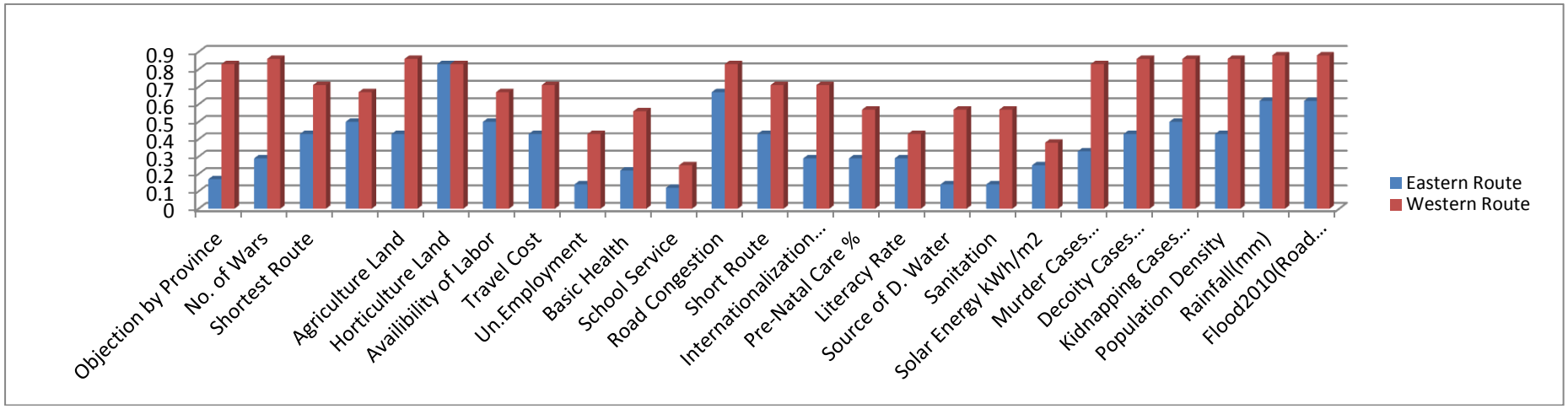


Diagram 5.44: All the criteria in which Western Route is Preferable

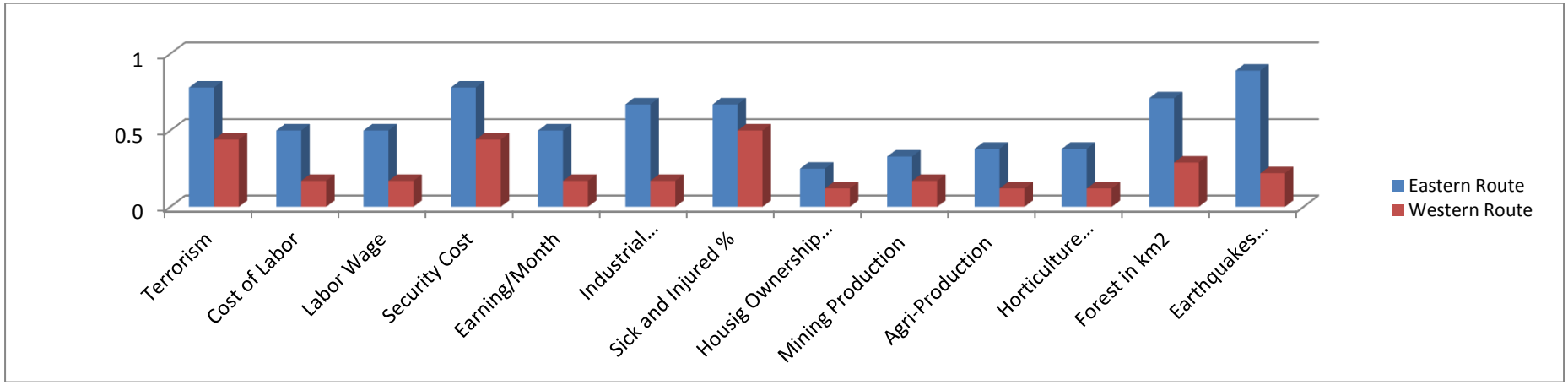


Diagram 5.45: All the criteria in which eastern route is better than western

Chapter 6

Conclusion

On the basis of comprehensive framework, both the routes have been evaluated to find the best route of CPEC. These routes have been evaluated on the basis of aggregate result and the results of each criterion of the framework. Western route didn't get high score only in aggregate result but 24 out of total 38 criteria preferred the construction of western route over eastern route. So, it shows western route is more preferable as compare to eastern route for the construction.

Finally, this study has done mainly two things: Firstly, a comprehensive decision making framework based on multiple criteria has been generated which hasn't only been established to find out the best route of CPEC but it has been generated in such way which can be applied to assess the optimal option out of many alternatives of any project like Dams, after certain modifications. Secondly, the optimal route of CPEC has been found by using the multiple criteria based framework. In other words, this study has tried to fulfill its objectives by generating a comprehensive decision making framework and evaluating both the routes on this framework. Thus, in this way, the findings of this research show that western route is better than the eastern route of CPEC.

6.1 Policy Recommendations

The results of this study might be helpful pertaining to the planning of the routes of CPEC in both present and future. Thus, on the basis of its findings, some policy recommendations and suggestions are being proposed to the policy and decision makers:

1. The results of this study show that the social indicators like Health, Education and living standards are poorer on western route as compare to eastern route. For instance, on western route, only 43% households have sanitation facility whereas on eastern route, the situation is far better than western route where 74% household have

sanitation facility. On western route, other indicators of basic needs like pre-natal care, literacy rate, source of drinking water are far poor than that of eastern route. Thus, western route needs economic opportunities and public facilities on priority basis to improve the living standards of local people. Now, in the form of the routes CPEC, the government has an appropriate opportunity to provide economic and social development opportunities on western route.

2. On many forums, western route was demanded more than eastern route by the provincial governments and political parties from Balochistan and KPK. But, the most significant out of all those forums were All Parties Conferences conducted by both provincial governments and political parties where the construction of western route was unanimously demanded before the construction of eastern route. Although, many times, the government of Pakistan has ensured that western route will be built at every cost but, still, the people of western provinces have very serious reservations and doubts. So, the government tries to build western route at least parallel to eastern route to stop all types of negatives and rumors about the routes of CPEC. Otherwise, it can become a serious political challenge to the unity of Pakistan.
3. Both eastern and western routes have been planned to build on eastern and western sides of Pakistan respectively. On both the sides, the areas of these routes aren't far away from both the eastern and western borders of Pakistan. Thus, both the routes can be affected from their own border side in the time of war with neighboring countries. But, history tells the eastern route is far sensitive than western route because all the wars between Pakistan and its neighbors taken place only on eastern border. In future, Pakistan has also more threat of wars on eastern border instead of western border. The Cold Start Doctrine of India is the best example of threat of war in future on eastern border. The state of Pakistan needs to build a much secure and alternate supply route

from its southern to northern areas. The western route can be a best option in this case because it is far away from eastern border and it will be new route in its areas whereas on eastern side Pakistan already has sufficient road-networking in form of Indus Highway.

4. When trade corridors are made, they plan to pass in such areas where they can link maximum number of regional countries. The three corridors of Greater Mekong Subregion is very good example of this mindset. These corridors were built in such way in which they became able to connect all the regional countries through shortest possible routes. Alike all successful corridors, Making the routes of CPEC as an international trade corridor is one of potential objectives of CPEC. Thus, if both the routes of CPEC are compared with respect to their potential for international trade, western route has more potential to attract regional countries to do trade with rest of the world via Pakistan because, western route has six landlocked countries on its side which would be potential users of this route whereas eastern route hasn't a single landlocked country which has to use this route for its trade. Hence, the government of Pakistan tries to build western route according to the needs and requirements of a successful international corridor because of its international scope.
5. In industrialization phase of CPEC, the government tries to allocate as much industries as it can on western route because it would eliminate high unemployment in the districts adjacent to western route; it would help to control industrial congestion in the districts adjacent to eastern route. If more industries are allocated in industrial congested areas of eastern route, it can adversely affect the environment.

6.2 The Limitations of Study

Although many projects of CPEC such as Roads, Sea-Port and Electricity Production Plants are being built currently but, according to the government of Pakistan, the scope of CPEC

will be extended till many other sectors namely, Industrialization, Tourism, Agriculture, International Trade Route and Mining etc. As all these sectors will be the part of CPEC in future, therefore, it hasn't been finalized that how these sectors will be intervened. For example, in industrialization, the scale and types of industries haven't been decided for both the routes. Even, the places of industrial parks on both the routes haven't been finalized yet. According to the government official, planning about all these sectors are being done. Hence, the information on all those sectors isn't available yet. If this information is available at this time, this study enables to evaluate both the routes of CPEC in more depth and try to propose its recommendations about their future. Now, in future, when the detailed information on these sectors becomes available, it will provide a chance to researchers to conduct more research studies on these sectors of CPEC that how they can be more and more beneficial for Pakistan.

Appendixes

Appendix (A)

Table A.1: Comprehensive Criteria Framework

Objective		Criteria	Unit	Description	References
1: Maximizing Political Stability		Number of Wars Fought	Number	Total number of wars fought between Pakistan and its neighbor since 1947 has been taken as the data.	(Shrestha & Chongvilaivan, 2013)
		Number of Objections Raised by Provinces	Number	Total number of objections raised by provincial governments and political parties in All Parties Conferences has been taken as the data.	(Khan, 2016) (Bangali, 2015)
2: Maximizing Sustainable Economic Growth	2.1 Minimizing the Construction Cost of Projects	Cost of Labor	Rupees	The wage per month of employed individuals has been as proxy to check the cost of labor.	(Ishida, 2007) (Morukov, 2004)
		Transportation Cost	Kilometers	The distance from Karachi Port to each district of both routes has been taken in kilometers to examine construction cost in term of transportation of inputs.	(Maurer & Yu, 2016) (Vinokurov & et. al, 2016)
		Destruction Cost of Physical Infrastructure	Percentage	The percentage of built-up out of total area in each district has been taken to check the expected destruction cost of physical infrastructure on both routes	(Phyrum & et.al, 2007)
		Agriculture Land	Hectares	The agriculture area of four major crops Wheat, Cotton, Rice and Sugarcane has been taken as proxy to measure how much agriculture land will be used by both the routes	(LingfeiWenga & KlintuniBoedhihartono, 2013)
		Horticulture Land	Hectares	The areas of all types of fruits production has been used as proxy to examine how much area of horticulture land will be affected by both routes	(Phyrum & et.al, 2007)
	2.2: Maximizing Investment	Availability of Labor Force	Percentage	The Labor Force Participation Rate has been taken as proxy variable to know the availability of labor force on both the routes	(Yagura, 2013) (Ishida, 2007)
		Security Cost	Number	The total number of terrorist attacks in one year has been used as proxy variable to examine the security cost on each route	(Hyder & et.al, 2015) (Abadie & et.al, 2008)
		Transportation Cost	Kilometers	Travel distance has taken to examine the transportation cost on both the routes. The more the distance, the higher the transportation cost.	(Vinokurov & et. al, 2016)

	2.3: Minimizing Economic Disparity	Un-Employment	Percentage	The unemployment rate on both routes has been knew by using its data of one year.	(Dutta & Gupta, 2014) (Phyrum & et.al, 2007)
		Earning/Month	Rupees	The wages per month of employed individuals in formal sectors has been taken as the proxy to judge the earning level of local people lived on both routes	(Shrestha & Chongvilaivan, 2013) (Dutta & Gupta, 2014)
		Basic Health Units	Percentage	The people satisfaction about basic health unit has been used to inspect the provision of the facility on both routes.	(Haq & Farooq, 2016)
		Provision of School Service	Percentage	The people satisfaction about the school service has been taken as proxy variable to inspect the provision of the facility on both routes.	(Shrestha & Chongvilaivan, 2013)
	2.4: Maximizing Trade	Road Congestion	Number	The number of registered vehicle in all the districts of each route has been used to judge the road congestion in the areas of both routes.	(Phyrum & et.al, 2007) (Ishida, 2007)
		Industrial Congestion	Number	The total number of industrial units registered on both the routes has been taken as proxy to measure the industrial congestion.	(Shrestha & Chongvilaivan, 2013)
		Internationalization of the Routes	Number	The total number of landlocked countries on side of each route has been utilized to inspect the scope of international trade of both routes	(Arvis & et.al, 2011) (Kudo, 2013)
3: Maximizing Social Prosperity		Sick and Injured	Percentage	The data of sick and injured individuals in each district of both the routes been used to check the status of this criterion on both sides	(Shrestha & Chongvilaivan, 2013)
		Pre-Natal Care	Percentage	The data of taking pre-natal care has also been used to measure the health status of the local people.	(Phyrum & et.al, 2007)
		Literacy Rate	Percentage	Literacy rate in all the districts of both routes has been taken as proxy variable to judge the education level along each route.	(Haq & Farooq, 2016)
		Source of Drinking Water	Percentage	The source of drinking water has been used as proxy variable to investigate the living standards of the local people of both the routes.	(Phyrum & et.al, 2007)

	Availability of Sanitation	Percentage	The availability of sanitation has also been used as the proxy variable to know the living standards of the people lived on both the routes	(Shrestha & Chongvilaivan, 2013)
	Percentage of Housing Ownership	Percentage	The Housing ownership has been taken to measure the living standards of the natives of both the routes.	(Phyrum & et.al, 2007)
4: Maximizing Technological Advancement	Potential of Solar Energy Production/day	kWh/day/ m2	The potential of solar energy production has been used to check the potential of attracting foreign technology of this sector.	(Vinokurov, Balas, & Michael Emerson, 2016)
	Annual Mining Production	Ton	The total production of mining in one recent year has been taken to judge the potential of this sector for attracting technology from abroad.	(Lingfei Wenga et. al, 2013) (F.Laurance & JeffreySayer, 2014)
	Agriculture Production	Ton	The total agriculture production in one year has been used to inspect the potential of this sector for attracting technology from abroad.	(Shrestha & Chongvilaivan, 2013)
	Horticulture Production	Ton	The total horticulture production in one year has been utilized to judge the potential of this sector on both the routes.	(Lingfei Wenga et. al, 2013) (Shrestha & Chongvilaivan, 2013)
4: Maximizing the Security of Routes	Terrorism	Number	The total number of terrorist attacks in one recent year has been used as proxy to measure the intensity of terrorism on both the routes.	(Hyder & et.al, 2015) (Abadie & et.al, 2008)
	Murder Cases Filed/Year	Number	The data of total number of murder cases filed in one year has been used to check the law and order situation on both the routes of CPEC.	(Havi, 2014) (Kumar S. , 2013)
	Decoity Cases Filed/Year	Number	The data of total number of decoity cases filed in one year has been used to inspect the crimes rate both the routes of CPEC.	(Hyder & et.al, 2015)
	Kidnapping Cases Filed/Year	Number	The data of total number of kidnapping cases filed in one year has been used to know the law and order situation on both the routes of CPEC.	(Kumar S. , 2013) (Havi, 2014)
6: Minimizing Environmental	Population Density	Ratio	The data of population density has been taken to check the populous congestion on both the routes of corridor.	(Ishida, 2007) (Benjamin R. Sperry)
	Forestation	Percentage	The percentage share of forestation out of total area of both the route has been taken as data to examine	(Karani, 2012) (Benjamin R. Sperry)

			the effect of these routes on forests.	
	Rainfall	Millimeter	The total amount of rain falling in one recent year has been used as data to judge the intensity of rain in the areas of both the routes.	(Amy & et.al, 2014) (Sloan, 2015)
	Flood 2010	Kilometers	The data of road-infrastructure damages in flood 2010 has been utilized to check the danger of floods for both the routes in future.	(Nemry & Demirel, 2012)
	Earthquakes	Number	The total number of causalities in last four earthquakes has been taken as proxy to judge the sensitivity earthquakes for both the routes in future.	(Maurer & Yu, 2016)

Table A.2: Detailed Data Sources (Section wise)

S. No.	Criteria	Sources of Data
Political		
1	No. of Wars Fought	Books and Newspaper
2	No. of Objections	Dawn Newspaper
Economic		
3	Cost of Labor	Labor Force Survey of Pakistan 2013-14
4	Shortest Route	Distance Calculator: Globe Feed. Com
5	Destruction Cost	Land Atlas of the Provinces&Pakistan
6	Agriculture Land	Crops area & production (2013-14)
7	Horticulture Land	Crops area & production (2013-14)
8	Labor Force Participation Rate	Labor Force Survey of Pakistan 2013-14
9	Security Cost	Pakistan Security Report 2014 of Pakistan Institute of Peace Study
10	Travel Cost	Distance Calculator: Globe Feed. Com
11	Un-Employment	Labor Force Survey of Pakistan 2013-14
12	Earning/Month	Labor Force Survey of Pakistan 2013-14
13	Basic Health Units	Pakistan Social Living and Measurement (PSLM) Survey
14	School Service	Pakistan Social Living and Measurement (PSLM) Survey
15	Road Congestion	Bureau of Statistics of all four provinces
16	Industrial Congestion	Census of Manufacturing Industries 2005-06
17	Internationalization of the Routes	Google Earth Map
Social		
18	Sick and Injured	Pakistan Social Living and Measurement (PSLM) Survey
19	Pre-Natal Care	Pakistan Social Living and Measurement (PSLM) Survey
20	Literacy Rate	Pakistan Social Living and Measurement (PSLM) Survey
21	Source of D. Water	Pakistan Social Living and Measurement (PSLM) Survey
22	Availability of Sanitation	Pakistan Social Living and Measurement (PSLM) Survey
23	Percentage of Housing Ownership	Pakistan Social Living and Measurement (PSLM) Survey
Technological		
24	Potential of Solar Energy Production/day	Solar and Wind Energy Resource Assesment (SWERA) Website
25	Annual Mining	Bureau of Statistics of all Four Provinces

	Production	
26	Annual Agriculture Production	Crop Area and Production 2008-09
27	Annual Horticulture Production	Crop Area and Production 2013-14
Legal		
28	Terrorism	Pakistan Security Report 2014 by Pakistan Institute of Peace Study
29	Murder Cases Filed/Year	Police Websites of all Four Provinces
30	Decoity Cases Filed/Year	Police Websites of all Four Provinces
31	Kidnapping Cases Filed/Year	Police Websites of all Four Provinces
Environmental		
32	Population Density	Estimated
33	Forestation	Land Use Atlas of Four Province and Pakistan
34	Rainfall	Pakistan Statistical Year Book 2014
35	Flood 2010	National Disaster Management Authority (NDMA) Annual reports
36	Earthquakes	National Disaster Management Authority (NDMA) Annual reports

Appendix (B)

Table B.1: The weights of all the criteria

Serial No.	Criteria	Weights
Political Criteria		
1	Number of Wars Fought	0.051
2	Number of Objections Raised by Provinces	0.055
Economic Criteria		
3	Cost of Labor	0.044
4	Shortest Route	0.046
5	Destruction Cost of Physical Infrastructure	0.047
6	Agriculture Land	0.051
7	Horticulture Land	0.049
8	Labor Force Participation Rate	0.041
9	Security Cost	0.043
10	Travel Cost	0.037
11	Un-Employment	0.036
12	Earning/Month	0.032
13	Basic Health Units	0.030
14	School Service	0.032
15	Road Congestion	0.024
16	Industrial Congestion	0.027
17	Internationalization of the Routes	0.026
Social Criteria		
18	Sick and Injured	0.020
19	Pre-Natal Care	0.019
20	Literacy Rate	0.022
21	Source of Drinking Water	0.017

22	Availability of Sanitation	0.017
23	Percentage of Housing Ownership	0.015
Technology Criteria		
24	Potential of Solar Energy Production/day	0.010
25	Annual Mining Production	0.015
26	Annual Agriculture Production	0.013
27	Annual Horticulture Production	0.011
Legal Criteria		
28	Terrorism	0.058
29	Murder Cases Filed/Year	0.007
30	Decoity Cases Filed/Year	0.005
31	Kidnapping Cases Filed/Year	0.010
Environmental Criteria		
32	Population Density	0.005
33	Forestation	0.0010
34	Rainfall	0.0037
35	Flood 2010	0.0056
36	Earthquakes	0.0030

Appendix (B)

Table B.2: Overall results

Lower Scale	Eastern Route	Western Route	Upper Scale
0	0.44	0.55	1

Source: Results Estimated in M. MACBETH Software

Table B.3: Political Section

Serial No.	The Names of Criteria	Lower Scale	Eastern Route	Western Route	Upper Scale
1	Objections Raised by Provinces	0	0.17	0.83	1
2	No. of Wars Fought	0	0.29	0.86	1

Source: Results Estimated in M. MACBETH Software

Table B.4: Economic Section

Serial No.	The Names of Criteria	Lower Scale	Eastern Route	Western Route	Upper Scale
1	Cost of Labor	0	0.50	0.17	1
2	Shortest Route	0	0.43	0.71	1
3	Destruction Cost of P. Infrastructure	0	0.50	0.67	1
4	Agriculture Area	0	0.43	0.86	1
5	Horticulture Area	0	0.83	0.83	1
6	Labor Force Participation Rate	0	0.50	0.67	1
7	Security Cost	0	0.78	0.44	1
8	Travel Cost	0	0.43	0.71	1
9	UN-Employment Rate	0	0.14	0.43	1
10	Monthly Earning/Individual	0	0.50	0.17	1
11	Basic Health Units	0	0.22	0.56	1
12	School Service	0	0.12	0.25	1

13	Road Congestion	0	0.67	0.83	1
14	Industrial Congestion	0	0.67	0.17	1
15	International scope of Routes	0	0.29	0.71	1

Source: Results Estimated in M. MACBETH Software

Table B.5: Social Section

Serial No.	The Names of Criteria	Lower Scale	Eastern Route	Western Route	Upper Scale
1	Sick and Injured (%)	0	0.67	0.50	1
2	Pre-Natal Care (%)	0	0.29	0.57	1
3	Literacy Rate	0	0.29	0.43	1
4	Housing Ownership (%)	0	0.25	0.12	1
5	Source of Drinking Water	0	0.14	0.57	1
6	Sanitation	0	0.14	0.57	1

Source: Results Estimated in M. MACBETH Software

Table B.6: Technological Section

Serial No.	The Names of Criteria	Lower Scale	Eastern Route	Western Route	Upper Scale
1	Potential of Solar Energy Production/day	0	0.25	0.38	1
2	Mining Production/Year	0	0.33	0.17	1
3	Agriculture Production/Year	0	0.38	0.12	1
4	Horticulture Production/Year	0	0.38	0.12	1

Source: Results Estimated in M. MACBETH Software

Table B.7: Legal Section

Serial No.	The Names of Criteria	Lower Scale	Eastern Route	Western Route	Upper Scale
1	Terrorism	0	0.78	0.44	1
2	Murder Cases Filed/Year/km2	0	0.33	0.83	1
3	Decoity Cases Filed/Year/km2	0	0.43	0.86	1
4	Kidnapping Cases Filed/Year/km2	0	0.50	0.83	1

Source: Results Estimated in M. MACBETH Software

Table B.8: Environmental Section

Serial No.	The Names of Criteria	Lower Scale	Eastern Route	Western Route	Upper Scale
1	Population Density	0	0.43	0.86	1
2	Forestation	0	0.71	0.29	1
3	Rainfall (mm)	0	0.62	0.88	1
4	Flood 2010	0	0.62	0.88	1
5	Earthquakes	0	0.89	0.22	1

Source: Results Estimated in M. MACBETH Software

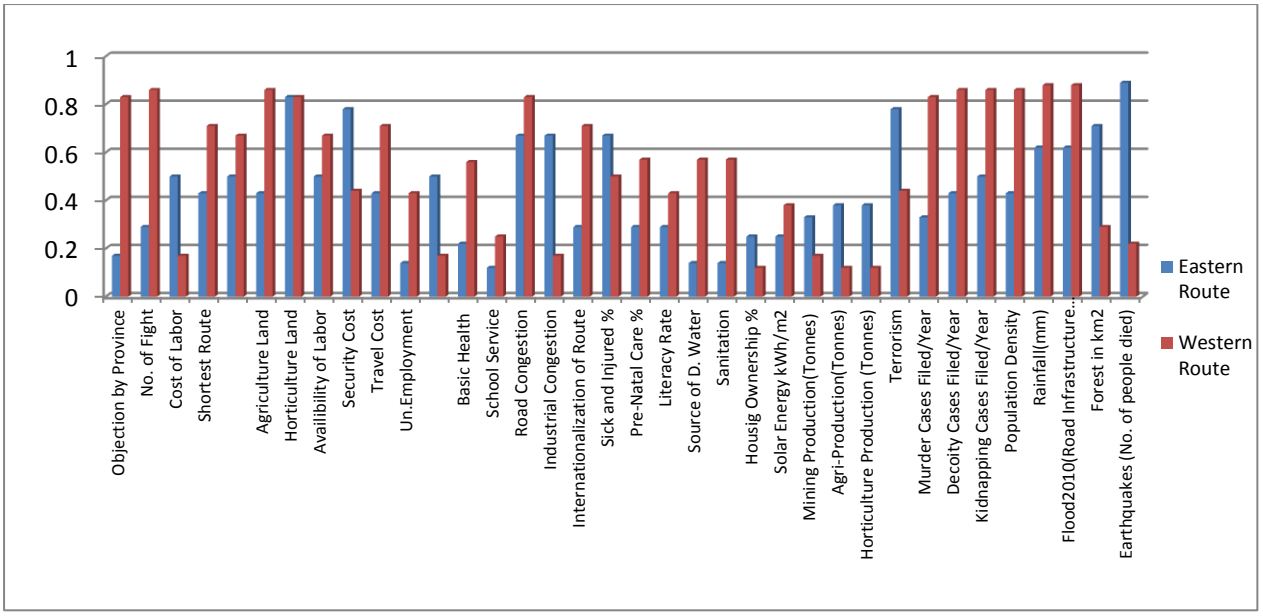


Diagram B.1: All the Criteria of Comprehensive Framework

Bibliography

Abadie, A., & et.al. (2008). Terrorism and the world economy. *European Economic Review, 52*(01), 01-27.

Abid, M., & Ashfaq, A. (2015). CPEC: Challenges and Opportunities for Pakistan. *v16*, Page No: 146-155.

Ahmad, D. A. (2015, November 15). Gwadar: Potential and Prospects. *Pak Institute for Conflict and Security Studies (PICSS)*, Pages No: 04-12.

Ahmar, M. (2015). Strategic Meaning of the China-Pakistan Economic Corridor. *Institute of Stretegic Study, Islamabad*, Page No: 44-46.

Alam, K. (2016, July 21). 2015-16: China helps as FDI in Pakistan surges 38.8%. *The Express Tribute*. Retrieved from http://tribune.com.pk/story/1146075/2015-16-china-helps-fdi-pakistan-surges-38-8/

Ali, M. M., & Dr. Farida Faisal. (2016). CPEC, SEZ (Special Economic Zones) and Entrepreneurial Development Prospects in. p:15.

ALI, Z. (2016, January 01). Khattak threatens 'extreme step' over CPEC project. *Dawn*.

AMIR, R. M. (2016, June 19). Making the most of CPEC. *DAWN*. Retrieved from http://www.dawn.com/news/1265737/making-the-most-of-cpec

Amy, S., & et.al. (2014). Climate change and infrastructure impacts: comparing the impact on roads in ten countries through 2100. *ScienceDirect*, p: 306.

Arvis, J.-F., & et.al. (2011). *Connecting Landlocked Developing Countries to Market: Trade Corridors in 21st Century.* Washington, DC: The World Bank.

Bangali, D. K. (2015). *China-Pakistan Economic Corridor: The Route Controvers.* Karachi: The Times Press - Karachi.

Benjamin R. Sperry, J. M.-Z. (n.d.). Development of Multicriteria Decision Method for Evaluating Decision High-Speed Rail Corridor. *Texas A&M Transportation Institute, Oregon State University*, p: 34.

CPEC PROJECTS . (2015). Retrieved from CPEC: CHINA PAKISTAN ECONOMIC CORRIDOR : http://www.cpec.gov.pk/index#

De, P. (2014). Economic Corridors and Regional Economic Integration. In P. D. Iyengar, *Developing Economic Corridors in South Asia.* Asian Development Bank.

Dutta, S., & Gupta, S. (2014). Economic Corridors and Pro-Poor Private Sector Development in South Asia: A Case Study of Bangladesh and India. *Asian Development Bank*, p: 218-219.

Esteban, M. (2016, July 05). The China-Pakistan Corridor: a transit, economic or development corridor. *Institute of Stretegic Study Islamabad (ISSI)*, p: 02-07.

F.Laurance, W., & JeffreySayer. (2014). Agricultural expansion and its impacts on tropical nature. *Trend in Ecology and Evaluation, 29*(02), 107-116.

Faye, M. L., Sachs, J. D., & Snow, T. S. (2004). The Challenges Facing Landlocked Developing Countries. *Journal of Human Development, 5*(1), 31-68.

Hali, S. M., & et.al. (2014). One Belt and One Road: Impact on China-Pakistan Economic Corridor. *Institute of Stretegic Study Islamabad, Pakitan*, Pages No: 09-15.

Haq, R., & Farooq, N. (2016). Impact of CPEC on Social Welfare in Pakistan: A District Level Analysis. *Pakistan Society of Development Economists*, p: 27-28.

Havi, E. D. (2014, January). THE ECONOMIC IMPACT OF CRIME RATE ON ECONOMIC PERFORMANCE IN GHANA. *SAVAP International, Vol. 5*, p: 08.

Hyder, S., & et.al. (2015, January). IMPACT OF TERRORISM ON ECONOMIC DEVELOPMENT IN PAKISTAN. *PAKISTAN BUSINESS REVIEW*, p: 704.

Iqbal, A. (2016, August 28). CPEC: a positive outlook. *THE EXPRESS TRIBUNE > OPINION*. Retrieved from http://tribune.com.pk/story/1171552/cpec-positive-outlook/

Ishida, M. (2007, October). Evaluating the Effectiveness of GMS Economic Corridors: Why is There More Focus on the Bangkok-Hanoi Road than the East-West Corridor? *INSTITUTE OF DEVELOPING ECONOMIES (IDE), JETRO*, p:13.

Karani, P. (2012). Environmental implications of the road network in South Africa. *DEVELOPMENT BANK OF SOUTHERN AFRICA (DBSA)*, p: 08.

Keola, S. (2013). Impacts of Cross-Border Infrastructure Developments:The Case of the First and Second Lao–Thai Mekong Friendship Bridges. In M. Ishida, *Border Economies in the Greater Mekong Sub-region* (p. P: 182). IDE-JETRO.

KHAN, A. U. (2015, January). PAK-CHINA ECONOMIC CORRIDOR: The Hopes and Realities. *Institute of Regional Studies, Islamabad*, Page No: 23-26.

Khan, I. (2016, November 09). China and Pakistan beyond CPEC. *Pakistan Observer*. Retrieved from http://pakobserver.net/china-and-pakistan-beyond-cpec/

Khetran, M. S. (2015). The Potential and Prospects of Gwadar Port. *Istitute of Strategic Study Islamabad (ISSI), Pakistan*, Pages No: 06-09.

Krongkaew, M. (2004). The development of the Greater Mekong Subregion (GMS): real promise or false hope? *Journal of Asian Economics, 15*(5), 977-998.

Kudo, M. I. (2013). Progress in Cross-Border Movement and the Development of Border Economic Zones. *IDE-JETRO*.

Kumar, A., & et.al. (2017). A review of multi criteria decision making (MCDM) towards sustainable renewable energy development. *Elsevier*, p: 596-597.

Kumar, S. (2013, August). Crime and Economic Growth: Evidence from India. *Munich Personal RePEc Archive (MPRA)*, p: 01.

LingfeiWenga, & KlintuniBoedhihartono, A. (2013). Mineral industries, growth corridors and agricultural development in Africa. *Global Food Security, 02*(03), 195-202.

Malik, D. A. (2016, May 17). CPEC: Transforming Pakistan's economy. *The Nation*. Retrieved from http://nation.com.pk/columns/17-May-2016/cpec-transforming-pakistan-s-economy

Marwat, A. J. (2016, January 20). CPEC controversy. *Dawn*.

Maurer, N., & Yu, C. (2016). What Roosevelt Took: The Economic Impact of the Panama Canal, 1903-37. p: 09-12.

Morukov, M. (2004). The. *Hoover Press : Gregory/Gulag*, p: 152-153.

Nemry, F., & Demirel, H. (2012). *Impacts of Climate Change on Transport:A focus on road and rail transport infrastructures.* Sevilla, Spain : Luxembourg: Publications Office of the European Union, 2012.

Neogi, C. (2014). Infrastructure Development, Industrial Agglomeration and Regional Trade in South Asia. In P. D. Iyengar, *Developing Economic Corridors in South Asia* (p. 57). Asian Development Bank.

Phyrum, K., & et.al. (2007, October). Social and Economic Impacts of GMS Southern Economic Corridor on Cambodia. *Research and Learning Resource Center MEKONG INSTITUTE*.

Rahman, M. M. (2014). Trade Potential and Economic Cooperation between Bangladesh and Northeast India. *Asian Development Bank*, p: 192.

RITZINGER, L. (2015). *The China-Pakistan Economic Corridor Regional Dynamics and China's Geopolitical Ambitions.* Washington, D.C.: THE NATIONAL BUREAU OF ASIAN RESEARCH (NBR).

Rizvi, H. A. (2015). The China-Pakistan Economic Corridor: Regional Cooperation. *Institute of Strategic Studeis Islamabad, Pakistan*, Page No: 10-11.

Safdar, A. (2015). The China-Pakistan Economic Corridor – Its Maritime Dimension and Pakistan Navy. *Institute of Stretegic Study Islamabad (ISSI), Vol.35_No.3*, P: 05-15.

Shrestha, O. L., & Chongvilaivan, A. (2013). Greater Meakon Subregion: From Geopolitical to Socio-Economic Integration. *Institute of Southeast Asian Studies, Singapore*, 45.

Sial, S. (2015). The China-Pakistan Economic Corridor: an assessment of potential threats and constraints. Page No: 02-05.

Sloan, S. (2015). Estimating the Environmental Costs of Africa's Massive "Development Corridors". *Current Biology, 25*(24), 3202-3208.

Teravaninthorn, S., & Raballand, G. (2009). *Transport Price and Cost in Africa: A Review of the International Corridors.* Washington, DC: The World Bank.

Vinokurov, E., Balas, P., & Michael Emerson. (2016, August). *Development of Transport and Infrastructure in Eurasia.* Internation Institute for Applied System Analysis (IIASA).

Yagura, K. (2013). Cambodia: The Economic Potential of the Thai Border Areas. *IDE-JETRO*.

Zarkoon, A. B. (2016, January 7). Why Balochistan is silent for receiving its share in CPEC? *Daily Balochistan Express Quetta*.

Zimmerman, T. (2015, October). The New Silk Roads: China, the U.S., and the Future of Central Asia. *CENTER ON INTERNATIONAL COOPERATION, NEW YORK UNIVERSITY*, p: 06.