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# **Evaluating the CPEC from Sustainability Perspective**

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#### **Evaluating the CPEC from Sustainability Perspective**

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#### Abstract

Keeping in view the global debate on megaprojects sustainability, the focus of the current study was to propose and test a parsimonious research model by incorporating the structural interrelationships of sustainable development issues of Pakistan with economic, social and environmental dimensions of mega projects of CPEC as a means to sustainable development in Pakistan. By using purposive sampling technique on a sample of 267 diverse stakeholders of CPEC in Pakistan, online survey-based data collection were made. To fit the model to the data, PLS-based Structural Equation Modeling (SEM) technique was used. The results of this study revealed that concern about sustainable issues of Pakistan explains significantly the variance in economic followed by environmental and social dimensions of CPEC. The current study further found that environmental, economic and social dimensions of CPEC jointly explains the variance in sustainable development of Pakistan. Finally, the current study found that environmental, social, and economic dimensions of CPEC partially mediate the relationship between concern for sustainable issues and sustainable development of Pakistan. These results implied that megaprojects should not be based on geopolitics or 'iron law of megaprojects' in terms of survival of the un-fittest, with the un-fittest projects going built up, instead of the best. Further, the results implied that megaprojects like CPEC should be diverted from G-7 based Universalist market-efficiency assumption to new institutions, such as the China-led Asian Infrastructure Investment Bank based view of economics mainly driven by sustainable policies in diverse indigenous settings like Pakistan. Theoretical contributions, limitations, and directions for future research have also been discussed.

**Key Words**: One Belt One Road, China Pakistan Economic Corridor, Sustainable Development Goals, Sustainability, Megaprojects

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# **1. Introduction**

We are living in an age of remarkable global investment in megaprojects, where world in 2015 spent \$9.5 trillion-14 % of global GDP on infrastructure-roads, railways, airports, ports, water, power, and telecoms that provide fundamental public services for economic development, social production, and daily life, and form the backbone of modern societies (McKinsey Global Institute, 2017; Flyvbjerg, 2014). China was the world's largest infrastructure market in 2015 with 38 % of global spending, followed by North America 21 % and Western Europe 17 % (McKinsey Global Institute, 2017). In the forthcoming decades, to keep pace with increased projected GDP growth, global infrastructure spending on megaprojects to facilitate economies will be at about USD 3.7 trillion per year between 2016 and 2035 or \$69.4 trillion total to 2035, out of which China will spend 34 % (McKinsey Global Institute, 2017). This, technology, green revolution, and consumption driven high growth oriented Chinese economy is consistent with its 13th five-year plan (2016-2020) and 'Made in China 2025' vision that act as a guiding principle to implement this new growth paradigm (State Bank of Pakistan -SBP, 2018)

Therefore, China is in the process of surpassing the US economically as 35% of world growth from 2017 to 2019 will come from China followed by US-18%, India-9%, and Europe- 8%. By 2050, China, India, the US, Brazil and Indonesia are to be among the top five largest global economies (World Economic Forum-WEF, 2018). Already in its fifth year, China's Belt and Road Initiative (BRI) development vision could see up to \$8 trillion invested across 68 countries from the edge of East Asia all the way to East Africa and Central Europe that account for 62% of the world's population and 40% of its economic output. Moreover, in Pakistan, where the China-Pakistan Economic Corridor (CPEC), part of BRI, is expected to generate \$62 billion in investment. So as BRI investments in megaprojects is actualized, the process will stimulate inclusive growth that will "touch the lives of millions of people who are cut off from the mainstream, thus can serve genuine needs, facilitating cope with an anticipated increase in the demand for food, energy, and water (WEF, 2017).

However, unless the escalation in megaprojects is vigilantly rechanneled and managed, the effort is probably to be fruitless and unsustainable. In the absence of representative controls, investors may personalize profits and socialize losses, while interlocking in carbon-intensive and other environmentally and socially spoiling modes (World Economic Forum, 2015). Therefore, the progressing and expansion of megaprojects is increasingly calling for considerations on various economic, environmental, and social issues around the world (Levitt,

2007; Qiu, 2007; Shen et al., 2010; Xue et al., 2015; Lin et al., 2016; Zeng, Ma, Zeng, & Tam, 2017; Aarseth et al. 2017). This call is in line with United Nations' Sustainable Development Goals (SDGs). These 17 goals-169-targets aspire a vision for sustainable development for all countries that takes on social inclusion, economic growth, and environmental protection (UN, 2015). Across the goals, 42 targets emphasis on methods of implementation, and the final goal-Goal 17, is entirely devoted to means of execution. So, there must be greater recognition on interconnecting across sectors (e.g., energy, finance, agriculture, and transport), across societal actors (government agencies, local authorities, civil society, and private sector), and between and among low, medium and high earnings nations (Stafford-Smith et al., 2017). The importance on sustainable development is consistent with international policy debate on inclusive economic and environmental sustainability. It is also logically consistent with recent international notional and prescriptive shifts in macroeconomic policymaking, from Universalist market-efficiency assumptions to the importance on sustainable policies in diverse indigenous settings (Luckhurst, 2018). Keeping in view the same vision, Long Term Plan (LTP) for CPEC (2017-2030) has described the project as:

[T]he CPEC is a growth axis and a development belt featuring complementary advantages, collaboration, mutual benefits and common prosperity. With the comprehensive transportation corridor and industrial cooperation between China and Pakistan as the main axis, and with concrete economic and trade cooperation, and people to-people exchange and cultural communications as the engine, CPEC is based on major collaborative projects for infrastructure construction, industrial development and livelihood improvement, aimed at socio economic development, prosperity and security in regions along it. (LTP CPEC, 2017-2030, p. 5)

China at present is in the execution phases of its CPEC projects in Pakistan value over \$60 billion mostly in infrastructure including railways and roads, and power production. With a threefold-increase in investment from China (mostly in power and construction), net FDI in Pakistan grew by 56 % in Q1-FY18. Over the past five years, China-Pakistan trade has sustained to increase sharply at an average annual growth rate of 18.8%. Besides, mutual investment has also been rising, and China happened to be the huge sources of foreign investment for Pakistan. International economic and technological cooperation has gained momentum, reaching into diverse areas and soaring a higher threshold. Moreover, social along with people-to-people exchange has been growing, mutual relationships keep developing. By utilizing their individual comparative advantage and building up inclusive collaboration on

CPEC, both Pakistan and China are expecting to bring their all-encompassing, socio-economic cooperation to an unprecedented height (LTP for CPEC, 2017-2030; State Bank of Pakistan, 2018).

Although, numerous published research papers (see table-01 under appendix-A) are available on CPEC, however their major focus was on the highlighting the importance of CPEC, the various aspects of CPEC, the impacts of CPEC on the relationship of countries, social impacts of CPEC, Challenges faces by implementing CPEC projects and current developments in CPEC. According to the best knowledge of the author of this project, very limited research work available which sheds light on the CPEC from sustainability perspective (see e.g. Khwaja, Saeed, & Urooj 2018 in terms of Environmental Impact Assessment of CPEC Northern Route Road Construction Activities; Li, Mancini, Su, Jing & Menenti, 2017 in terms of Monitoring Water Resources and Water Use from Earth Observation in the Belt and Road Countries; Ahmed, Arshad, Mahmood, & Akhtar, 2017 in terms of Neglecting human resource development in BRI, a case of the China-Pakistan economic corridor; Ruilian, Andam, and Shi, 2017 in terms of environmental and social risk evaluation of overseas investment under the CPEC; Huang, Fischer, & Xu, 2017 in terms of the stakeholder analysis for SEA of Chinese foreign direct investment: the case of 'Belt and Road Initiative' in Pakistan). However, none of the referred studies incorporate quantitatively the interrelationships of sustainable development issues of Pakistan with economic, social and environmental dimensions of CPEC as a means to sustainable development. Hence, evaluating the CPEC from sustainability perspective is still a hotcake for researchers and needs to be explored further.

Hence, this paper aims to evaluate the mega projects of CPEC from sustainability perspective by taking concern for sustainability issues of Pakistan as an independent variable and further the economic, social and environmental dimensions of CPEC as mediator variables between sustainability issues and sustainable development. Thus, in line with shift of The World Bank within the context of Asian global financial crisis-1997-98 from supporting the 'Washington Consensus' to the 'post-Washington Consensus', by associating country specific sustainability issues with mega projects of CPEC as a means to sustainable development, this study specifically target to provide more rigor economic, environmental, and social analysis to pave the way to implement the SDGs with suitable attention to local circumstances (Stafford-Smith et al., 2017; Luckhurst, 2018).

The rest of the paper is organized as follows: First, literature review along with study hypotheses and research framework will be provided. Second, research methodology and results and data analysis will be discussed. Finally, research implications along with limitations and direction for future research will be provided.

# 2. Literature Review

#### 2.1 Sustainable Development and CPEC

Since Brundtland Commission (World Commission on Environment and Development, 1987) put sustainable development as '*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*' and the seminal texts including

- Hans Carl von Carlowitz-1713- 'comprehensive treatise about sustainable yield forestry' concerning cut only as many trees as grow back,
- *Rachel Carson-1962- 'Silent Spring' concerning* the adverse effects on the environment of the indiscriminate use of pesticides,
- Donella H. Meadows, D.H., Meadows, D.L., Randers, J., Behrens, W.W-1972- 'Limits to Growth' concerning the consequences of mankind's use of earth's natural resources,
- *E.O. Wilson-1985- 'The Crisis of Biological Diversity*' concerning the disappearance of natural habitat is the primary cause of biological diversity loss, and
- John Elkington-1997- 'Cannibals with Forks: the Triple Bottom Line of 21st Century Business' concerning harmony between economic, social and environmental dimensions,

there has been a growing consensus among nations, both developing and developed, to strengthen the means of implementation and reinvigorate the global partnership for Sustainable Development Goals (SDGs)—17 global goals with 169 targets—to be achieved by 2030 (UN, 2015).

However, these inclusive largest historical debated SDGs, will count little unless all stakeholders organize dynamically to execute the same as conceived. As a conceptual model, the SDGs lead the preceding Millennium Development Goals (MDGs) by linking the economic, social, and environmental dimensions of goals. This in turn suggests associating across time—making ensure that the interim accomplishment of better individual comfort does not earn at the cost of compromising comfort in the long run by harming the environmental and social capital on which our global life-support mechanism rests on (Stafford-Smith et al.,

2017). How is this to be accomplished? In this regard, it has been argued as BRI is not definite an SDG initiative, however, it incorporates many of the same principles that are needed for SDG implementation: cooperation between states, long term planning, and the development of public-private partnerships. Thus, since the SDGs and BRI are mutually supportive development agendas in terms of ambition and scale, therefore, BRI can, and should, be made into the world's initial regional strive to execute the SDGs (Sha, 2016).

Within BRI, China Pakistan Economic Corridor is journey towards economic regionalization in the globalized world. It founded peace, development, and win-win model for all of them. CPEC is hope of better region of the future with peace, development and growth of economy. CPEC is one of the huge business investments around the world estimating \$62 billion investment plan in various projects such as, energy, railways track, roads, oil and gas pipelines, industrial development, fiber optic cables and construction of Gawadar port (Dawn News, 2017).

Every project is going to generate unprecedented job opportunities, which would also reduce unemployment and enhance growth in the country. The CPEC could emerge an environmental corridor to lead the development of regional renewable-energy trade, and associate Pakistan to China's countrywide carbon market, which is already the globally biggest, thus making a regional market (Sheikh, 2016). CPEC envisioned as part of BRI /Maritime Silk Route initiative launched by China will link producers and consumers of Pakistan and China to 50 countries across the globe (Ministry of Finance, 2017). Furthermore, according to Dawn News (2016), the chairman of the Punjab Board of Investment and Trade stated that CPEC is not only attracting domestic investors but also foreign capital. Further, the report, titled 'World Investment Report 2017: Investment and the Digital Economy', says foreign direct investment (FDI) to Pakistan rose by 56 % last year, pulled by China's rising investment in infrastructure under the CPEC (United Nations Conferences on Trade and Development, 2017). Some of the under-construction CPEC projects have also attracted a large amount of foreign investment, especially in electricity generation and transport (Dawn News, 2017b). CPEC will not only benefit China and Pakistan but will have positive impact on Iran, Afghanistan, India, Central Asian Republic, and the region. Thus, in order to motivate potential investors (domestic and foreign) and to enhance foreign direct investment, the policy makers of CPEC should closely think about the sustainable business practices. CPEC will also improve the GDP of Pakistani economy as well as the GDP of stakeholder countries. The CPEC offers immense opportunities for achieving Pakistan's development objectives (Ministry of Finance, 2017). Besides these

benefits, the different projects (energy, railways track, roads) of CPEC also have social and environmental impacts on Pakistani economy. The maximum electricity projects in CPEC are based on coal energy and researchers have reported that coal-related activities are serious prospects for the environment and the health of people (Bilgen, 2016; Verma, Loha, Sinha and Chatterjee, 2017). In addition, Verma et al., (2017) claimed that coal is the basic source of energy but it emits toxic gasses after combustion. These negative effects coal-related activities can be reduced by implementing an effective environmental planning (Huang and Finkelman, 2008). If BRI successfully integrate the sustainable development agenda into its own plans, it will help shape a new kind of multilateralism—one that exists outside the structures of preexisting international organizations but can have significant development impacts if guided appropriately (CIRSD, 2016). Thus, it is very important for policy makers/ personnel of CPEC to engage in sustainability practices.

#### 2.2 Sustainable issues, CPEC and Sustainable Development

Pakistan is the sixth-most populous country globally, with a population exceeding 207 million people on a land area of 796,095 km<sup>2</sup>, most of which is arid or semiarid. Pakistan is facing many serious sustainable development issues (see Table-2) that could be greatly affected by foreign direct investment like CPEC.

Currently, with a score of 32.6, Pakistan ranked 106 out of 119 developing countries in Global Hunger Index-2017. Thus, lags behind India and even most of the African states. Moreover, more than 58% Pakistanis are suffering from food insecurity (Ramay, 2018). Therefore, in terms of food security-socioeconomic and physical access to nutritious food for a healthy and active life-Pakistan ranked as 77 among 113 countries (Global Food Security Index-GFSI, 2017). Moreover, compared to Bangladesh's 120 and India's 116 position, Pakistan has ranked 147 out of 188 countries in the Human Development Index (HDI, 2016) report. This low HDI score impelled Pakistan's staggering struggle far away from attaining SDGs as it scored 55.6 under SDGs' global index (2017) against a far better regional average of 63.3 and is even lower than regional peers Bangladesh's 56.2 and India's 58.1. As a result, the country ranked 122 out of 157 nations on the SDG index (2017).

Besides, Pakistan incurred loses of Rs365 billion each year due to environmental degradation problems. Therefore, in latest global Environmental Performance Index (EPI-2018)-Pakistan across 24 performance indicators of environmental health and ecosystem ranked at 169 out of 180 countries. EPI-2018 further provides that major populations still suffering from poor air

quality mainly in Pakistan, India and China. Moreover, the latest Global Climate Risk Index (GCRI-2018) ranked Pakistan as the seventh (out of ten) most vulnerable country to climate change. Besides, Pakistan incurred human and economic losses of 10,462 lives and \$ 3.8 billion respectively in 20 years. Moreover, the super floods of 2010 ranked Pakistan among the countries most affected by climate change by incurring loss of US \$25.3 billion representing 5.4% of the GDP (GCRI, 2018). Thus, climate change is becoming major cause of more rainstorms and flooding (Huang, Fischer and Xu, 2017).

Furthermore, in terms of groundwater use, India, the United States of America, China, Iran and Pakistan (in descending order) accounting for 67% of total abstractions worldwide (UN World Water Development Report, 2018). Therefore, Pakistan has been ranked as one of the most water stressed nations in the world (Kochhar et al. 2015). Moreover, drinking water safety and water pollution are major concerns in Pakistan as 16 million people in Pakistan don't have access to safe water. Furthermore, over 68 million people don't have access to adequate sanitation (Water Aid, 2016). Besides, in terms of Forest area (% of land area), during the past 25 years, in 1990 it was the highest i.e. 3.28%, however as of 2015, the value was lowest i.e. 1.91%. Therefore, in terms of biodiversity, among the countries of South Asia, Pakistan has the least variety of animals and plants per representative unit of area (World Bank, 2017).

In addition, in Global Peace Index (2017), Pakistan ranked as 152. However, within South Asia, Bhutan with the ranking of 13 been declared as the most peaceful nation followed by Sri Lanka 80th, Bangladesh 84th, India 137th, and Afghanistan 162nd. Besides, due to continuous engagement in the war on terror, which has destroyed the socio-economic fabric of the country, both local and foreign direct investment have been hampered. Therefore, by securing 8.4 out of 10, Pakistan ranked 5<sup>th</sup> out of 10 most affected countries on the Global Terrorism Index (GTI-2017).

Finally, the Global Competitiveness Report-2017-18, which compared governance in 137 countries ranked Pakistan at 115<sup>th</sup> -still lowest as compare with its regional peers (India-40<sup>th</sup>, Bhutan-82<sup>nd</sup>, Sri Lanka 85<sup>th</sup>, Nepal 88<sup>th</sup> and Bangladesh 99<sup>th</sup>).

Table-02: Key Sustainable indicators of Pakistan			Criticality
Air	Carbon dioxide (CO2) emissions-2016	0.83	
	(Per Capita-Metric Tons)		
	PM2.5 air pollution, mean annual	65	0.8
	exposure (micrograms m <sup>3</sup> )-2015		

	PM2.5 air pollution, % of population	100%	0,8
	exceeding WHO guideline value-2015		
Water	Improved water source (% of population	91%	0.64
	with access)-2015		
	Renewable internal freshwater resources,	55	0.85
	total (billion cubic meters)-2014		
	Improved sanitation facilities (% of	64%	0.69
	population with access)-2015		
	Water productivity, total (constant 2010	1	0.96
	US\$ GDP per cubic meter of total		
	freshwater withdrawal)-2014		
Forest	Forest area (% of land area)-2015	1.91%	0.89
Environmental	Environmental Performance Index	37.50	0,94
Performance	2018-Global Rank 169 (OF 180)		
Sustainable	Sustainable Development Goals Index55.60.78		0.78
Development	2017-Global Rank 122 (OF 157)		
Goals			
Global	Global Competitiveness Index	3.67	0,84
Competitiveness	2017-18-Global Rank 115 (OF 137)		
GDP per capita,	GDP Per Capita, PPP	US\$	0.74
PPP (2015)	2015-Global Rank 114 (OF 153)	4,706	
Human	Human Development Index (2016)	55	0.78
Development	2016-Global Rank 147 (OF 188)		
Global Peace	Global Peace Index (2017)	3.058 0.95	
	2017-Global Rank 152 (OF 163)		
Subjective	Subjective Wellbeing (2016)	55	0.47
Wellbeing	2016- Global Rank 62 (OF 133)	ık 62 (OF 133)	
Global Food	Global Food Security Index-2017	47.8 0.68	
Security	2017-Global Rank 77 (OF 113)		
Global Hunger	Global Hunger Index-2017	32.6	0.89
	2017-Global Rank 106 (OF 119)		
Global Climate	Global Climate Risk Index-2018	30.50	0.70
Risk	2018- Global Rank 7 (OF 10)		

Global Terrorism	Global Terrorism: Index: report-20178.40.5		0.5
	2018- Global Rank 5 (OF 10)		
Health	Life expectancy at birth, total (years)-	66.332	0.76
	2015		
Unemployment	Unemployment, total (% of total labour	5.9%	0.87
rate	force) (national estimate)-2015		
	Employment to population ratio (% ages	51.0%	0.99
	15 and older)		
Economic	Total reserves (includes gold, current	22,027.60	0.34
	US\$)-2016 (million)		
Education	Literacy rate, adult total (% of people ages	57 %	0.90
	15 and above)-2014		
Energy	Access to electricity (% population)-2012	93.6%	0.54
	Energy intensity of transportation sector	6.245	0.60
	(MJ/2011 USD PPP)-2012		
	Renewable generation capacity (GW)-	6.841	0.37
	2012		
NT1 1.1 1.			1 6.1

Note: the criticality is calculated by dividing the rank of Pakistan by the total number of the ranked countries. The bigger value (closer to 1) indicate the lower ranker (maximum = 1, minimum = 0).

Source: The World Bank, World Development Indicators (2008-2016); United Nations Human Development Programme, Human Development Indicators plus other Current World Global indexes

Thus, we may conclude that Pakistan is at a critical situation today. The nation's future growth and well-being depend advisably on confronting a number of above mentioned complex issues. Many of these issues are based in the continuous challenges of alleviating poverty, enhancing food security, and fostering inclusive economic growth all over the country. Solutions to these issues will partially arrive from formulating plans, polices and investments that assist the majority of poor, rural individuals and food-insecure urban households. Only with a more honest realizing of how to implement, monitor, and amend these solutions will country's growth and poverty reducing goals be accomplished (International Food Policy Research Institute, 2018). In this regard, Center for International Relations and Sustainable Development

(CIRSD, 2016), proposed that if the sustainable development and BRI successfully integrated, a new form of multilateralism will have been created. This new model will combine the best of the United Nations, including global consensus around future direction, and the best of China's growing leadership in the world—namely, a focus on long term investments and infrastructure development. In doing so, BRI can prove to be a new and innovative form of multilateralism for the twenty-first century—one that focuses on solving the most pressing sustainable development challenges of the world. Therefore, to implement the BRI vision, China has announced that it will invest US\$62 billion in Pakistan relating to Gwadar Port as well as to the energy, transportation and infrastructure sectors by 2030, so paving the way to end the severe energy issues and transform Pakistan into a new regional economic and social hub (Huang, Fischer and Xu, 2017).

Therefore, the CPEC-multi-dimensional investment, which comprises interest-free loans, soft loans, and export credit is a ray of hope for Pakistan. However, despite its potential benefits, some people without understanding the positive linkage between poverty and environmental degradation, criticize CPEC on its possible impact on environment and climate change. The poor living in the neighborhood of forests try to consume whatever is available for their survival leading to deforestation, soil erosion, and further to environmental degradation and climate change. In the worst-case scenario, in emerging economies, due to the prospect of greater employment opportunities, rural-urban migration becomes the main cause behind the rapid urbanization. Therefore, creating problems on multiple fronts including environmental degradation-cutting of trees and reduction of green areas due to high demand of roads, increased pressure on water and sanitation, and exposure to high air pollution due to increase in the number of vehicles (Ramay, 2018).

However, Long Term Plan (LTP) under CPEC have touched all important sectors of inclusive socio-economic growth including *connectivity with road and rail infrastructure*, *information network*, *trade*, *energy*, *agriculture*, *industrial parks*, *poverty alleviation*, *tourism*, *people's livelihood and non-governmental exchanges*, *and financial cooperation*. Besides, the LTP put more emphasis to *modernization of industry* that would change Pakistan into industrialised nation similar to developed nations (LTP CPEC, 2017-2030).

Moreover, the LTP envisioned to *transform agriculture into new agro-based technologies*, seeds, and irrigation mechanism, and put importance on the economic development in accordance with "Pakistan's Vision of 2025". More importantly, the development of Special

*Economic Zones (SEZs)* would facilitate industrial sectors to smoothen supply chains, improve partnership and innovation capabilities, and further assist local economies by utilizing local resources to boost both employment opportunities and to enjoy more economies of scale. Special Economic Zones (SEZs) will also help to create new economic opportunities across the country with the vision to boost local economies to use local resources, and to provide employment opportunities to local people. This will help to reduce rural-urban migration, which in return would facilitate to reduce the issue of pollution in big cities on a sustainable basis (LTP CPEC, 2017-2030: State Bank of Pakistan, 2018; Ramay, 2018)

Besides, the LTP has three phases: *The short, medium, and long term projects* will be executed step by step and to be finalized by 2020, 2025, and 2030 respectively. In the short run, important issues like *energy, and infrastructure development* will be focused. Analysis shows that the share of coal in Pakistan's energy mix in comparison to developed and developing countries is very low (less than 10%) and it will remain low despite the investment in new coal fired power plants under CPEC. Therefore, coal will be utilized to tackle the energy crisis. It is in Pakistan's favor to generate cheap energy for increasing industrial competitiveness, and make an investment in renewable energy. Therefore, both governments-China & Pakistan-are already investing in renewable energy projects like Quaid-e-Azam Solar Park in Punjab and windmills in Sindh. New projects are also in the pipeline. Moreover, China will also help Pakistan to excel in the production of renewable energy related technologies (LTP CPEC, 2017-2030: Kiani, 2018, 2018; Ramay, 2018)

In addition, water shortage will be managed through dam building and river planning by emphasizing major thermal and hydropower development projects. This would enhance Pakistan's competitiveness in international market, reducing the carbon footprint as well as facilitating farming community in terms of reliable and adequate supply of water. Moreover, beyond power projects and road network, the LTP also provided that enterprises from China and Pakistan in shape of Public-private partnership would re-shape investment in a number of sectors.

Now CPEC has entered into the second phase of the Long-Term Plan (LTP) after the successful completion of the Early Harvest Projects (EHP) or brought them up to an advanced stage. The EHP were started in 2015 and an outstanding progress was witnessed within 32 months. However, year-2018 declared as a year of stock taking (see table-03 under appendix-A) and planning for the future of CPEC until 2030 with possible milestones to be achieved as follows:

- The execution would span from network of roads to railway network (e.g., *Karachi Circular Railway* of \$3.5bn and *Karachi-Peshawar Main Line (ML-1)* of \$8.2 billion).
- One important project under the CPEC-*the \$2bn Orange Line Mass Transit Project*-is expected to be completed during 2018.
- Working on three *special industrial/economic zones* (*Rashakai in Khyber Pakhtunkhwa*, *Dhabeji in Sindh and M-3 in Faisalabad*, *Punjab*) would also be a great step.
- Within energy sector, *Port Qasim Coal fired project* of \$2bn being developed by Sinohydro Resource of China and Al-Mirqab Captial of Qatar with a generation capacity of 1320MW would attain commercial operations by June 2018
- With a minor delay in coal mining, none of the *power projects in Thar* would be operationalized in 2018, however, two *wind projects of 50MW* each in Sindh are expected to give production by September 2018.
- One of the two 660MW units of *China-Hub Coal Power Company* (660x2) is expected to initiate operations by December 2018.
- *The Quaid-e-Azam Solar Park in Punjab* was scheduled to add about 400MW, to the existing 300MW capacity, to reach 700MW.
- At Gwadar, a \$150 million *Eastbay Expressway project* is scheduled to be materialized before the end of 2018. Moreover, efforts are being applied to deliver within next year the \$130m worth *Freshwater Treatment facility*, of five million gallons per day, very important for Gwadar Port.
- Similarly, a 39-km Havelian-Abbotabad-Mansehra part of \$3.5bn Karakoram Highway (KKH) Phase-1 is also approaching for completion in May 2018 after the completion of four out (Multan-Bahawalpur-Sukkur-Sadiqabad) of seven sections of \$2.6bn Peshawar-Karachi Motorway in April, 2018).
- Apart from another road project spanning Dera Ismail Khan to Hakla section of dual carriageway, *the cross-border optical fibre cable* is also due in 2018 (Kiani, 2018).

Moreover, the early harvest projects under CPEC produced more than 30,000 direct jobs for Pakistanis while both midterm and long-term projects under CPEC are poised to produce hundreds of thousand job possibilities in the country (Jabri, 2018).

# 2.3 Hypotheses Development

In the light of above discussed literature and mentioned progress of early harvest projects (EHP) of CPEC, the current study is going to hypothesize the interrelationships of sustainable

development issues of Pakistan with economic, social and environmental dimensions of CPEC and further with sustainable development of Pakistan in the following hypotheses:

*Hypothesis-1*: Concern about sustainable issues of Pakistan has positive link to economic dimension of CPEC.

*Hypothesis-2*: Concern about sustainable issues of Pakistan has positive link to social dimension of CPEC.

*Hypothesis-3*: Concern about sustainable issues of Pakistan has positive link to environmental dimension of CPEC.

*Hypothesis 4:* Economic dimension of CPEC has positive link with Sustainable Development of Pakistan.

*Hypothesis 5:* Social dimension of CPEC has positive link with Sustainable Development of Pakistan.

*Hypothesis 6:* Environmental dimension of CPEC has positive link with Sustainable Development of Pakistan.

*Hypothesis-7*: Concern about sustainable issues of Pakistan has positive link with Sustainable Development of Pakistan.

*Hypothesis 8:* Economic, social and environmental dimensions of CPEC mediate the relationship between concern about sustainable issues and sustainable development of Pakistan.

# 3. Research Methodology

#### **3.1 Research Model Construction**

Based on the above discussed supporting literature and hypotheses, figure-01 proposes a multivariate analysis based parsimonious partial least squares-structural equation modelling (PLS-SEM, also called PLS path modelling) that simultaneously analyse multiple structural interrelationships of sustainable development issues of Pakistan with economic, social and environmental dimensions of CPEC (H1, H2, H3) as a means to sustainable development in Pakistan (H4, H5, H6, H7, H8) and the items measuring each construct of the model. Path modelling as shown in figure-01 is a diagram used to visually display the hypotheses and variable relationships that are examined when SEM is applied (Hair Jr, Hult, Ringle, &

Sarstedt, 2016). Constructs-concern for sustainable issues, economic, social and environmental dimensions of CPEC along with sustainable development (i.e., variables that are not directly measured) are represented in path models as circles. The indicators also called as items or manifest directly measured variables including the raw data are represented in path models as rectangles. Relationships between constructs as well as between constructs and their assigned indicators are shown as single-headed arrows-directional-predictive relationship coupled with significant theoretical support can be interpreted as causal relationships (Hair Jr et al., 2016).



Figure-01 Proposed research model

The variate is a linear combination of several variables that are chosen based on the research problem at hand. The process for combining the variables involves calculating a set of weights, multiplying the weights (e.g.,  $w_1$  and  $w_2$ ) times the associated data observations for the variables (e.g., concern<sub>1</sub>....concern<sub>14</sub>, economic<sub>1</sub>....economic<sub>14</sub>, social<sub>1</sub>....social<sub>5</sub>, environ<sub>1</sub> .....environ<sub>5</sub>, econ<sub>1</sub>.....econ<sub>1</sub>, soc<sub>1</sub>.... soc<sub>7</sub>, env<sub>1</sub>...env<sub>5</sub>), and summing them. As an example, the mathematical formula for this linear relationship with 14 variables of concern for sustainable issues is shown as follows (note that the variate value can be calculated for any number of variables) (Hair Jr et al., 2016):

Variate=concern1 w1+ concern2 w2+ concern3 w3+.....+ Concern14 w14,

#### **3.2 Sampling and data collection**

The researcher distributed online survey questionnaires among the respondents to collect the required data in order to complete the study. This questionnaire was developed on Google form. The justification for using Google survey form lies in its ability to automatically summarize the survey responses, presents the responses in graphical form and also cost effective. Furthermore, the researcher used purposive sampling technique to distribute the online questionnaire. The rationale for using purposive sampling lies in its ability to collect the data from concerned individuals. Collection of data from only concerned people is highly important in research as the data is meant to contribute to a superior understanding of theoretical framework (Bernard, 2002). Different sample sizes were recommended, however, according to general thumb of rule, a sample of 200 or above is sufficient for PLS-SEM approach (Anderson and Gerbing, 1988).

The researcher distributed the online survey questionnaire to only relevant people such as, academicians, senior analysts, management and engineers of various CPEC projects, management of Coal Power Plant, Sahiwal, senior officers of National Highway Authority, members of Ministry of Water & Power (MOWP) including WAPDA, Ministry of Railway-Pakistan, Chamber of Commerce, Private Power Infrastructure Board (PPIB), Federal Board of Revenue, Automotive Industry, and other senior personnel which belong to various institutions such as, Institute of Cost & Management Accountants of Pakistan, Pakistan Military Accounts Department, Pakistan Bar Council, and Bahria Town etc. The researcher successfully yielded 267 correctly responded questionnaires, hence comprised the sample of this study.

#### **3.3 Research instrument**

The online survey questionnaire was prepared by the faculty and students of M.Phil. & Ph.D. of Department of Commerce, Bahauddin Zakariya University after the detailed analysis of Long Term Plan-LTP under CPEC (2017-2030), Sustainable Development Goals of United Nations (2015), Frequently Asked Questions (FAQs) about CPEC available at official website of CPEC *http://www.cpec.gov.pk/faqs*, and literature about sustainable issues of Pakistan as provided in the literature part. This online survey is based on three parts. The first part of questionnaire was developed to yield the demographic information about the respondents such as, age of respondent, gender, education level of respondent, managerial position held by respondent and the name of respondents' department/authority/ministry. Furthermore, the second part of questionnaire was developed to collect the opinions of the respondents about the

CPEC and the third part of questionnaire was developed to collect the data about the study variables viz., concern about sustainable issues of Pakistan, Environmental aspect of CPEC, Economic aspect of CPEC, Social aspect of CPEC and Sustainable development of Pakistan. By following Huang et al. (2017), the construct 'concern about sustainable issues of Pakistan' was measured on five point Likert scale started from 1=Not at all concerned, 2=Slightly concerned, 3=Moderately concerned, 4=Very concerned and 5=Extremely concerned. In addition, remaining constructs '*Environmental aspect, Economic aspect, Social aspect and Sustainable development*' were also measured on Likert scale, where 1= Strongly Negative Impact, 2= Negative Impact, 3= No Impact, 4= Positive Impact and 5= Strongly Positive Impact. The researcher used multiple items for the measurement of study constructs (see table-04).

To measure environmental aspect of CPEC, keeping in view the environmental problems of Pakistan, the current study by following the recent studies on CPEC (Huang et al. 2017; Zhang et al. 2017) considered water, air, and biodiversity followed by soil, and noise as top issues to be considered by Chinese Foreign Direct Investment (FDI) under CPEC. Moreover, Environmental Impact Assessment (EIA) is the prerequisite of state environmental body of laws of both China and Pakistan in addition to Declaration on Environment and Development, formalized by both countries (Khwaja et al., 2018). Therefore, to measure environmental aspect of CPEC mega projects, based upon Sustainable Development Goals of United Nations (2015), and Long Term Plan-LTP under CPEC (2017-2030), survey items like 'use of supper critical technology & environmental safe guards', 'hydel projects', 'climate action', 'life under water', and 'life on the land' have been included in the research instrument.

Besides, to include the survey items on social aspect of CPEC, the current study followed the Long Term Plan-LTP under CPEC (2017-2030). The LTP (2017-2030) provided that transport and information network infrastructure including railway lines, motorways, and local communication networks and broadcast & TV networks is the primary and basic requirement that can be depended on to guide and drive the balanced and coordinated economic and social development of regions along the CPEC. In addition, LTP (2017-2030) provided that CPEC would significantly help towards ensuring inclusive development especially the socio-economic development of the less developed areas of the country by speeding up the urbanization and industrialization process capable of providing high-quality life to its citizen. Therefore, survey items like 'transportation convenience', 'railway line & motorways', 'balanced regional development', 'fiber optic cable from Gilgit-Baltistan, Khyber

Pakhtunkhwa to Rawalpindi', and 'development of less developed provinces' have been included to measure the social aspect of CPEC.

In addition, to measure the economic aspect of CPEC mega pro projects, again Long Term Plan-LTP under CPEC (2017-2030) have been considered. Survey items such as 'employment rate', 'annual revenue from toll collection', 'gross revenue of Gwadar port & free trade zones', 'gross revenue of special economic zones', 'foreign direct investment & local investment through sezs', 'ease of doing business (eodb) indicators', 'export focused global enterprises in the sezs', 'joint ventures of international enterprises with local industries', 'relative position of local industries in supply chain', 'energy projects', 'industrial parks & trade zones', 'evacuated energy of thar', 'up gradation of transmission system of electricity', and 'transport, energy & industrial parks' have been included to measure the economic dimension of CPEC.

Finally to measure the sustainable development, based upon sustainable development goals (SDGs) of United Nations (2015), different items (see Table=04) have been included in research instrument.

#### **Table-04 Research Instrument**

Items used to measure Individuals' Concern about Sustainable Issues of Pakistan on five point Likert scale (1= Not at all concerned, 2= Slightly concerned, 3= Moderately concerned, 4= Very concerned and 5= Extremely concerned)

Indicators	Statements
Concern1	Air Quality
Concern2	Climate Change (Change in Mean Rainfall, Risk of Flooding)
Concern3	Water Quality & Sanitation
Concern4	Availability of Clean Drinking Water
Concern5	Water Resources Consumption
Concern6	Underground Water Depletion
Concern7	Deforestation (Removal of Forest & Trees)
Concern8	Threat to Species
Concern9	Energy Usage & its Efficiency
Concern10	Renewable Energy Use
Concern11	Energy Demand Management
Concern12	Accessibility to Electricity
Concern13	Area of Agriculture & Green Spaces for Public usage

nization
1

Given below items were used to measure Environmental aspect of CPEC on five point Likert scale (Strongly Negative Impact, 2= Negative Impact, 3= No Impact, 4= Positive Impact and 5= Strongly Positive Impact)

Environmental1 Use of Supper Critical Technology & Environmental Safe Guards

Environmental2 Hydel Projects

Environmental3 Climate Action

Environmental4 | Life under Water

Environmental5 Life on the Land

Given below items were used to measure Economic aspect of CPEC on five point Likert

scale (Strongly Negative Impact, 2= Negative Impact, 3= No Impact, 4= Positive Impact and 5= Strongly Positive Impact)

Economic1	Employment Rate	
Economic2	The Annual Revenue from Toll Collection	
Economic3	Gross Revenue of Gwadar Port & Free Trade Zones	
Economic4	Gross Revenue of Special Economic Zones (SEZs)	
Economic5	Foreign Direct Investment & Local Investment through SEZs.	
Economic6	Ease of doing Business (EODB) Indicators	
Economic7	Export focused Global Enterprises in the SEZs.	
Economic8	Joint Ventures of International Enterprises with Local Industries	
Economic9	Relative Position of Local Industries in Supply Chain	
Economic10	Energy Projects	
Economic11	Industrial Parks & Trade Zones	
Economic12	Evacuated Energy of Thar	
Economic13	Up gradation of Transmission System of Electricity	
Economic14	Transport, energy & industrial parks	
Given below iten	is were used to measure Social aspect of CPEC on five point Likert scale	
(Strongly Negati	ve Impact, 2= Negative Impact, 3= No Impact, 4= Positive Impact and 5=	
Strongly Positive	e Impact)	
Social1	Transportation Convenience	
Social2	Railway line & Motorways	
Social3	Balanced Regional Development	
Social4	Fiber optic cable from Gilgit-Baltistan, Khyber Pakhtunkhwa to	
	Rawalpindi	

Social5	Development of less developed Provinces
Given below iten	ns were used to measure Sustainable Development on five point Likert
scale (Strongly N	Negative Impact, 2= Negative Impact, 3= No Impact, 4= Positive Impact
and 5= Strongly	Positive Impact)
Eco1	CPEC has impact on GDP Growth Rate
Eco2	CPEC has impact on Decent work & Economic Growth
Eco3	CPEC has impact on Industry, Innovation, & Infrastructure
Sco1	CPEC has impact on Poverty level (less developed provinces)
Sco2	CPEC has impact on Hunger Level
Sco3	CPEC has impact on Health & Well-being of People
Sco4	CPEC has impact on Education level (Less developed provinces)
Sco5	CPEC has impact on Gender Equality
Sco6	CPEC has impact on Reduction in Inequality
Sco7	CPEC has impact on Peace, Justice & Strong Institutions
Env1	CPEC has impact on producing Clean & Affordable Energy
Env2	CPEC has impact on building Sustainable Cities & Communities
Env3	CPEC has impact on Responsible Consumption & Production

#### **3.3 Statistical Treatment**

After yielding data, researcher used SPSS software for demographic analysis. Furthermore, PLS-SEM was applied through Smart-PLS software (Ringle et al., 2005) in order to analyse the data and to check the hypothesized relationships. The justification for using PLS-SEM approach lies in its ability to examine multiple relationships simultaneously and to achieves higher levels of statistical power and demonstrates much better convergence behaviour than CB-SEM (Reinartz et al., 2009; Henseler, 2010; Hair et al., 2014). Furthermore, numerous researchers claimed that PLS-SEM is better approach than CB-SEM in terms of dealing with small sample size and formatively measured constructs (Hair et al., 2012; Peng and Lai, 2012; Ringle et al., 2012; Hair et al., 2014). In PLS-SEM approach, data was analysed at two stages: (1) inner model analysis and (2) outer model analysis. In inner model analysis, researcher accesses the multicollinearity among the constructs, reliability and validity of the data. Outer model analysis was conducted to examine significance of the hypothesized relationships through beta-coefficients, t-values and p-values.

# 4. Data analysis

#### 4.1 Demographic analysis

Demographic analysis was conducted through the SPSS software. The results revealed that 218 were male and 49 were female respondents (see table-05). Furthermore, respondents age group was also assessed and results showed that 73 respondents were from the age group of 20 - 25years, 46 were from the age group of 26 - 30 years, 45 were from the age group of 31 - 35years, 50 respondents were from the age group of 36 - 40 years and remaining 53 respondents were more than 40 years old (see table-05). These results implied that young generation is more interested in CPEC. Moreover, the education level of the respondents was also assessed and results disclosed that majority of respondents have master level education. The employment status of the respondents was also considered in demographic part. The table-05 showed that 16.2 %respondents have the managerial position, 14 %respondents were head of their department, 18.5 % were from middle level management and remaining 51.3 % respondents have other than mentioned positions such as, own private business, senior analysts, academicians etc. Finally, the respondents' department/ authority/ ministry was also assessed through the questionnaire. The respondents' analysis highlighted that 89 were academicians, 12 were allied CAT engineers, 12 respondents were from coal power plant, Sahiwal, 11 respondents belong to national highway authority, 7 respondents were from banks, 48 respondents were from Ministry of Water & Power (MOWP) including WAPDA, 18 were from Ministry of Railways (MOR), 9 respondents belong to chamber of commerce, 13 respondents were the members of Private Power Infrastructure Board (PPIB), 11 respondents were the part of Federal Board of Revenue, 17 respondents were from automotive industry, and remaining 20 respondents belong to other institutions such as, Institute of Cost & Management Accountants of Pakistan, Pakistan Military Accounts Department, Pakistan Bar Council, senior staff members of Bahria town and media industry (see table-05).

Table-05 Demographic analysis			
Item	Responses Choice	Count (N)	Percentage
Gender	Male	218	81.6
	Female	49	18.4
Age	20-25	73	27.3
	26 - 30	46	17.2
	31 – 35	45	16.9

	36-40	50	18.7
	> 40	53	19.9
Education Level	Bachelor	25	9.4
	Master	160	59.9
	PhD	31	11.6
	Other	51	19.1
Employment Status	Managerial Position	45	16.9
	Department Head	37	13.9
	Staff of an Organization	49	18.4
	Other	136	50.8
Departments/Authority/Ministry	Academicians	89	33.34
	Allied CAT (Engineers)	12	4.5
	Coal Power plant Sahiwal	12	4.5
	National Highway	11	4.15
	Authority (NHA)		
	Banks	07	2.64
	Ministry of Water & Power	48	17.9
	(MOWP) including		
	WAPDA		
	Ministry of Railways	18	6.74
	(MOR)		
	Chamber of Commerce	09	3.37
	Private Power	13	4.87
	Infrastructure Board (PPIB)		
	Federal Board of Revenue	11	4.12
	(FBR)		
	Automotive Industry	17	6.37
	Pakistan		
	Others (ICMAP, PMAD,	20	7.5
	Bahria Town, PBC &		
	Media)		

## 4.2 Analysis of opinions about CPEC

After demographic information, respondents were asked to share their opinions about the CPEC project. In this regard, closed-ended questions were asked to respondents (see table-06). These questions were about the awareness of CPEC, importance of CPEC, impacts of CPEC and individuals' interest towards CPEC. After yielding responses, data was analysed through SPSS software. The results indicated that all respondents have listened about the CPEC. Furthermore, the respondents' knowledge about CPEC was also assessed and the results revealed that 43 respondents have some knowledge, 105 respondents have good idea about CPEC, 70 respondents have plenty of knowledge and 48 respondents have complete knowledge about the CPEC (see table-06). These 48 respondents include the senior academicians, experienced economic analysts, and key management of CPEC project.

The respondents' level of interest regarding CPEC was also measured. The results indicated that 9.4 % of respondents have shown little interest, whereas 34.5 % respondents have shown considerable interest regarding CPEC. In addition, individuals' attitude towards CPEC was also measured on Five-Point Likert scale starting from strongly negative to strongly positive. The results showed that most of the respondents have positive attitude towards CPEC projects i.e. 88 respondents=strongly positive and 140 respondents=positive (see table-06). Moreover, the involvement level of individuals and their institution in CPEC was also evaluated. The results showed that most of the respondents are involved in CPEC in terms of research, policy implications, awareness of CPEC, forecasting the societal, environmental and economic impacts of CPEC etc.

Table-06 Opinions of respondents about CPEC			
Questions	Responses Choice	Count (N)	Percentage
Have you ever heard about 'One Belt	Yes	266	100
One Road' (BRI) Strategy or China-	No		
Pakistan Economic Corridor?			
If yes then how well do you think you	No knowledge		
understand CPEC?	Some knowledge	43	16.1
	Good idea	105	39.3
	Plenty of knowledge	70	26.2
	Complete knowledge	48	18
Are you interested in CPEC?	No Interest		

	Little Interest	25	9.4
	Moderate Interest	78	29.2
	Some Interest	71	26.6
	Considerable interest	92	34.5
Which of these categories best	Strongly positive	88	33
describes your attitude towards CPEC	Positive	140	52.4
as the background described?	Neutral	28	10.5
	Negative	6	2.2
	Strongly Negative	5	1.9
To what extent do you/your institution	Not at all	21	7.9
involve over CPEC?	Little extent	51	19.1
	Moderate extent	57	21.3
	Some extent	71	26.6
	Large extent	67	25.1

## 4.3 Testing multicollinearity and normality

The issue of multicollinearity occurred when independent variables are highly correlated to each other. The multicollinearity among the exogenous variables is the serious threat to reliable results. Therefore, researcher accesses the level of multicollinearity through variance inflating factor (VIF). The constructs were considered to have acceptable level of multicollinearity if they hold lesser than 5 VIF score (Cenfetelli and Bassellier, 2009; Hair et al., 2014). The results were presented in table-07 which disclosed that all variables bear the tolerable level of multicollinearity.

Furthermore, normality of the data was assessed through the score of Skewness and Kurtosis (George and Mallery, 2003). These scores were obtained by using SPSS 20.0 software. The constructs meet the normality criterion, if the score of Skewness and Kurtosis lies between +1 to -1 (Hair et al., 2014). The statistical results show that all constructs meet the normality criterion (see Table-08). In addition, summary of the data was presented in table-09 which shows the minimum value, maximum value, mean and standard deviation. For the more consistent data, the value of mean should be higher than the standard deviation. The results for mean and standard deviation are presented in table-09.

Table-07 Multicollinearity statistics (VIF)		
Construct	VIF score	
Concern about Sustainable Issues of Pakistan	1.999	
Environmental Aspect of CPEC	2.068	
Economic Aspect of CPEC	2.651	
Social Aspect of CPEC	2.520	

Table-08 Results for normality analysis					
Constructs	Skewness	Kurtosis			
Concern about Sustainable Issues	-0.570	-0.917			
Economic Aspect	-0.871	0.590			
Social Aspect	-0.664	0.142			
Environmental Aspect	-0.700	0.175			
Sustainable Development	-0.753	0.143			

Table-09 Summary of the data						
Constructs	Minimum	Maximum	Mean	Standard Deviation		
Concern about Sustainable Issues	1.45	5.00	3.693	1.003		
Economic Aspect	2.13	5.00	4.076	0.568		
Social Aspect	2.00	5.00	4.018	0.631		
Environmental Aspect	1.67	5.00	3.891	0.683		
Sustainable Development	4.92	3.717	0.734			
Note: All constructs were measure on	Note: All constructs were measure on 5 points-Likert scale, starting from 1 to 5					

# 4.4 Testing reliability

The reliability of the constructs was measured through average variance extracted (AVE), score of composite reliability and Cronbach's alpha. The constructs were considered to meet the reliability criteria if they hold AVE  $\geq$  5 (Henseler et al., 2009; Anderson and Gerbing, 1988; Bagozzi and Yi, 1988), composite reliability  $\geq$  0.6 (Werts et al., 1974; Nunnally and Bernstein, 1994; Tenenhaus et al., 2005), and Cronbach's alpha  $\geq$  0.6 (Cronbach, 1951; Hair et al., 2014). The AVE score ranges from 0.471 (Economic Aspect) to 0.657 (Concern about Sustainable Issues). Furthermore, composite reliability ranges from 0.774 (Social Aspect) to 0.954 (Concern about Sustainable Issues) and Cronbach's alpha ranges from 0.582 (Social Aspect) to 0.946 (Concern about Sustainable Issues). Hence, the statistical results proved that all construct are reliable (see table-10).

Table-10 Average variance extracted, composite reliability and Cronbach's alpha ( $\alpha$ )						
Constructs	AVE	Composite	Cronbach's			
		Reliability	Alpha			
Sustainable Development	0.544	0.939	0.929			
Concern about Sustainable Issues of Pakistan	0.657	0.954	0.946			
Economic Aspect of CPEC	0.471	0.877	0.843			
Environmental Aspect of CPEC	0.649	0.844	0.732			
Social Aspect of CPEC	0.535	0.774	0.582			

# 4.5 Testing Validity

Factor loadings and cross loadings were used to test the validity of the data. The items of a construct were considered to be valid if they have greater than 0.6 factor loadings (Hair et al., 2014) and they share the highest loading with their own construct. Furthermore, all valid items of constructs were retained on above discussed conditions (see table-11). Moreover, the indicators which show insufficient loading were excluded from the study. In present study, 3 items of concern about sustainable issues (Concern11, Concern12, Concern14), 2 items of environmental aspect (Environmental1, Environmental2), 6 items of economic aspect (Economic2, Economic3, Economic4, Economic11, Economic12, Economic14), 2 items of social aspect (Social2, Social4) and 1 item (Env1) of sustainable development were removed due to inadequate loadings (see table-04 for detail of items).

Table-11 Factor loadings ( $\lambda$ ) and cross loadings						
Items	Concern	Economic	Environmental	Social	Sustainable	
	about	Aspect	Aspect	Aspect	Development	
	Sustainable					
	Issues					
Concern1	0.872	0.540	0.496	0.493	0.626	
Concern10	0.690	0.517	0.396	0.463	0.474	
Concern13	0.630	0.508	0.430	0.446	0.472	
Concern2	0.848	0.432	0.520	0.472	0.656	
Concern3	0.895	0.573	0.544	0.546	0.658	
Concern4	0.884	0.553	0.559	0.542	0.699	
Concern5	0.881	0.562	0.555	0.576	0.689	

Concern6	0.861	0.544	0.575	0.521	0.649
Concern7	0.769	0.448	0.438	0.372	0.510
Concern8	0.835	0.471	0.531	0.493	0.612
Concern9	0.695	0.508	0.467	0.494	0.486
Economic1	0.706	0.719	0.550	0.647	0.692
Economic10	0.316	0.674	0.488	0.521	0.424
Economic13	0.332	0.687	0.407	0.521	0.401
Economic5	0.338	0.690	0.400	0.454	0.399
Economic6	0.414	0.655	0.390	0.405	0.435
Economic7	0.378	0.726	0.385	0.531	0.425
Economic8	0.356	0.632	0.372	0.440	0.377
Economic9	0.381	0.704	0.458	0.457	0.470
Environmental3	0.393	0.557	0.634	0.466	0.451
Environmental4	0.543	0.513	0.873	0.542	0.773
Environmental5	0.552	0.519	0.885	0.527	0.737
Social1	0.580	0.568	0.554	0.798	0.603
Social3	0.374	0.530	0.474	0.705	0.473
Social5	0.333	0.535	0.314	0.686	0.356
Eco1	0.557	0.571	0.684	0.500	0.781
Eco2	0.607	0.630	0.546	0.619	0.655
Eco3	0.506	0.521	0.655	0.520	0.744
Env2	0.464	0.442	0.611	0.440	0.742
Env3	0.508	0.462	0.678	0.398	0.729
Env4	0.594	0.429	0.571	0.393	0.698
Env5	0.603	0.449	0.564	0.439	0.736
Soc1	0.518	0.568	0.514	0.588	0.630
Soc2	0.509	0.427	0.492	0.424	0.665
Soc3	0.584	0.477	0.657	0.543	0.794
Soc4	0.590	0.542	0.633	0.578	0.800
Soc5	0.534	0.452	0.621	0.452	0.778
Soc6	0.512	0.554	0.704	0.554	0.807

#### 4.6 Correlation among constructs

The association among the study constructs measured through the SmartPLS software. The correlational value shows the strength of relationships and the sign (+, -) of correlational value shows the direction of relationship. The results revealed that all constructs have positive association with each other. In addition, table-12 also revealed that all independent constructs (concern about sustainable issues, economic aspect of CPEC, environmental aspect of CPEC, social aspect of CPEC) share higher correlational value with dependant construct (sustainable development) which implied that exogenous variables are strongly associated with indigenous variable.

Table-12 Correlation among variables (γ)					
Construct	Concern about	Economic	Environmental	Social	Sustainable
	Sustainable	Aspect	Aspect	Aspect	Development
	Issues				
Concern about	1.000				
sustainable					
Issues					
Economic aspect	0.638	1.000			
of CPEC					
Environmental	0.623	0.642	1.000		
aspect of CPEC					
Social aspect of	0.612	0.740	0.632	1.000	
CPEC					
Sustainable	0.740	0.691	0.832	0.657	1.000
Development of					
Pakistan					

# 4.7 Predictive power of the model

The value of R-square represents the predictive power of the model. The statistical results disclosed that concern about sustainable issues of Pakistan explains 38.8 %to environmental aspect of CPEC, 40.5 %to economic aspect of CPEC and 37.4 %to social aspect of CPEC (see table-13). In addition, all these mentioned constructs (concern about sustainable issues, environmental aspect, economic aspect, social aspect) jointly predict 78.5 %to sustainable development (see table-13). According to Henseler et al. (2009) and Hair et al. (2014), the

value of R-square is interpreted weak ( $0.19 \le \text{R-square} < 0.33$ ), moderate ( $0.33 \le \text{r-square} < 0.67$ ) and substantial (R-square  $\ge 0.67$ ).

Table-13 Predictive power of the model (R <sup>2</sup> )					
Construct	R Square	Interpretation			
Environmental Aspect	0.388	Moderate			
Economic Aspect	0.405	Moderate			
Social Aspect	0.374	Moderate			
Sustainable Development	0.785	Substantial			

#### 4.8 Graphical representation of PLS-SEM results for direct and indirect effects

Direct effects are the association connecting two variables with a single arrow; indirect effects are those associations that take a sequence of relationships with at least one intervening construct involved (Hair Jr et al., 2016), The figure-02 graphically represents the PLS-SEM results for total direct effect of concern about sustainable issues of Pakistan on sustainable development of Pakistan. The magnitude of the relationship between concern about sustainable issues of Pakistan and sustainable development of Pakistan in terms of Beta Coefficient is 0.747. Furthermore, in terms of squared multiple correlation ( $R^2$ ), concern about sustainable issues of Pakistan.

Likewise, the figure-03 graphically represents the PLS-SEM results for indirect effects i.e. Concern about sustainable issues of Pakistan  $\rightarrow$  Environmental  $\rightarrow$  Sustainable Development, Concern about sustainable issues of Pakistan  $\rightarrow$  Economic  $\rightarrow$  Sustainable Development, and Concern about sustainable issues of Pakistan  $\rightarrow$ Social  $\rightarrow$  Sustainable Development.

In figure-03, in terms of squared multiple correlation ( $\mathbb{R}^2$ ), concern about sustainable issues predicts 38.8% variance in environmental, 37.4% variance in social and 40.7% variance in economic aspects of CPEC. Furthermore, in terms of squared multiple correlation ( $\mathbb{R}^2$ ) all independent constructs (concern about sustainable issues, environmental aspect, social aspect, economic aspect) jointly explains 78.5 variance in sustainable development.

In addition, path coefficients of in figure-03 represents the magnitude of indirect effects. The total of indirect effects always equal to the total of direct effects (Hair et al., 2014). Furthermore, for mediation analysis, researcher has divided the total indirect effect by total direct effect i.e. 0.747 (see figure-02). Through this, the researcher assessed the score of

variance accounted for (VAF) (see table-15). Currently, numerous research studies are following this approach for mediation analysis (Blanco-Oliver, Veronesi and Kirkpatrick, 2016; Mikalef and Pateli, 2017; Hassan et al., in press).



Figure-02 SEM model for direct effect



Figure-03 SEM model for indirect effects

## 4.9 Hypotheses testing

# 4.9.1. Direct Effects

Through outer model analysis, researcher evaluated the direction, magnitude, significance, and acceptance or rejection of hypothesized relationships. The direction and magnitude of relationships were assessed through the sign and value of beta coefficients. In present study, the value of beta-coefficients ranges from 0.086 (Social Aspect  $\rightarrow$  Sustainable Development) to 0.636 (Concern about sustainable issues  $\rightarrow$  Economic Aspect). Furthermore, the significance, and acceptance or rejection of hypotheses were evaluated through t-values and p-values. The empirical results showed that all hypotheses are significant at 0.01 level of significance (see table-14).

Table-14 Beta coefficients, standard deviation, t-values and p-values for direct effects					
Hypothesis	Hypothesized Relationships	Beta	Standard	T-values	
No.		Coefficients	Deviation		
H1	Concern about Sustainable Issues → Environmental Aspect	0.623	0.040	15.546***	
H2	Concern about Sustainable Issues → Economic Aspect	0.636	0.030	21.179***	
Н3	Concern about Sustainable Issues → Social Aspect	0.612	0.035	17.677***	
H4	Environmental Aspect → Sustainable Development	0.530	0.060	8.888***	
Н5	Economic Aspect → Sustainable Development	0.101	0.059	1.702*	
H6	Social Aspect → Sustainable Development	0.086	0.046	1.849*	
H7 Concern about Sustainable Issues $\rightarrow$ Sustainable Development 0.293 0.042 6.947***					
Note: * p<0.05, t= 1.965; *** p<0.001, t= 3.310; based on t(4999), percentile 95 %					
confidence interval, one-tailed test					

#### 4.9.2. Indirect effects

The mediation analysis was conducted by following Iacobucci et al. (2007). The score of variance accounted for (VAF) was assessed through using the following formula:

## VAF= Indirect effect/ Total effect

The significance of mediation effects was evaluated through the magnitude of VAF. The results showed that *Concern about Sustainable Issues* significantly influences the *Sustainable Development* through the mediation of *Environmental aspect* (VAF= 44.20 percent). The *Economic aspect* (VAF= 7.05 percent) and *Social aspect* (VAF= 8.60 percent) have showed the limited effects. However, the total indirect effect achieves the VAF score of 59.85 % and consequently, a situation in which the VAF is larger than 20% and less than 80% can be characterized as partial mediation (Hair Jr et al., 2016). Therefore, these results confirm *Hypothesis-8* that the association between *Concern about Sustainable Issues* and *Sustainable Development* is partially mediated by *Environmental aspect*, *Economic aspect* and *Social aspect* (see table-15).

	Table-15 Results of mediating effects						
Total Concer sustain on Develo	effect of rn about able issues Sustainable opment	Direct Concer sustain issues Sustain Develo	effects of rn about able on nable opment	Indirect effects on Sustainable I	of Concern a Developmen	about sustainable t	sissues
В	t-value	β	t-value	Mediator Construct	Point Estimate	Confidence Interval	VAF (%)
0.747	28.317***	0.293	6.947***	Environmental	0.330	[0.260; 0.398]	44.20
				Economic	0.053	[0.006; 0.131]	7.05
				Social	0.064	[0.006; 0.101]	8.60
Total indirect     0.447     59.8					59.85		
Note: tailed t	Note: *** p<0.001, t= 3.310; based on t(4999), percentile 95 % confidence interval, one- tailed test						

## 5. Discussion and Conclusion

#### 5.1 Discussion

Keeping in view the global debate on 'is the boom in megaprojects sustainable?', the current study proposed and tested a parsimonious research based model (see *figure-1*) by incorporating comprehensively the structural interrelationships of sustainable development issues of Pakistan with economic, social and environmental dimensions of mega projects of CPEC as a means to sustainable development of Pakistan. The current study found that the concern about sustainable issues of Pakistan (climate change, air quality, water quality and sanitation, under-ground water resources and consumption, availability of clean drinking water, renewable energy usage, deforestation, area of agriculture and green spaces, and energy usage and efficiency) explains the variance in (1) economic ( $R^2 = 40.5\%$ ) (Employment rate, foreign and local investment, ease of doing business indicators, public-private partnership in special economic zones, up gradation of transmission system of electricity) followed by (2) environmental (R<sup>2</sup> =38.8%) (Environmental safe guards, life under the water and on the land) and (3) social ( $R^2 = 37.4\%$ ) (Transport convenience, balanced regional development, and development of deprived areas) dimensions of CPEC (see Table-13). The current study further found that *environmental* ( $\beta$ =0.530), *economic* ( $\beta$ =0.101) and *social* ( $\beta$ =0.086) *dimensions of* CPEC (see Table-14) jointly explains the variance in sustainable development of Pakistan  $(\mathbb{R}^2 = 78.5\%)$  (Decent work and economic growth, industry, innovation and infrastructure, sustainable cities and communities, responsible consumption and production, poverty, hunger, health and well-being, education, and gender equality). Finally, the current study further found that environmental (VAF=44.20%), social (VAF=8.60%), and economic (VAF=7.05%) dimensions of CPEC (VAF total=59.85%) partially mediate the relationship between concern for sustainable issues and sustainable development of Pakistan (see Table-15).

The results of the current study endorse empirically the positive association of Pakistan specific sustainability issues with economic, social, and environmental dimensions of mega projects of CPEC as a means to sustainable development. In other words, CPEC in terms of economic corridor has provided Pakistan an excellent opportunity to maximize benefit on well-planned multifaceted highway road network and accelerate inclusive socio-economic growth by detaching infrastructure obstructions, advancing entry to markets, and increasing economic chances in deprived provinces and associating local governments with urban hubs and special economic zones. Therefore, CPEC appears as growingly vital to uplift agricultural and other commercial occurrences in a particular spatial area. Thus, the results of current study endorse

the socio-economic spatial development as a variable of the sustainable development paradigm (Roberts, 2003, Gul, 2017) by suggesting that it is crucial to assure that any use of mega projects related investments be crafted not only by caring personal profits, but also by upholding people rights and protecting the planet. In other words, to mitigate the risk that the desire of personal gain should not underestimate the public good, the results implied that laws regulating megaprojects related investments should integrate the inclusive socio-economic and environmental related risks as stressed by United Nations program on environment (WEF, 2015). The same is assured by China-Pakistan concerned authorities that the Belt and Road's each mega project under the CPEC has to pass through environmental impact assessment, and, therefore, would not degrade the environment. The authority further provided that Beijing would not relocate out of date production capacity to Pakistan (Dawn, 2017c).

These results further implied that megaprojects should not be based on geopolitics or "iron law of megaprojects", in terms of "over budget, over time, over and over again" or "survival of the un-fittest", with the un-fittest projects going built up, instead of the best (Flyvbjerg, 2014). Instead, these results implied that megaprojects like CPEC should be diverted from G-7 based *Universalist market-efficiency assumption* to new institutions, such as the China-led Asian Infrastructure Investment Bank based careful economics mainly driven by *sustainable policies in diverse indigenous settings like Pakistan (WEF, 2015)*. Due to the above paradigm shift in Pakistan in terms of megaprojects under CPEC, a decade highest GDP growth rate of 5.3% was achieved in 2017, which is expected to rise to 7% by 2020 (http://www.cpec.gov.pk/faqs).

Besides, the results implied that to attain sustainable development goals-SDGs, the world should scale-up the infrastructure and transform development finance to attract the large-scale private investments for megaprojects. Therefore, like China-led Asian Infrastructure Investment Bank based innovation in development finance be created. This thinking is in line with World Bank vision of *"From Billions to Trillions: Transforming Development Finance"*-suggesting that to attain SDGs, we need more than a money in terms of global change of mentalities, paradigms and responsibilities to reveal and change the new realities of a developing nations with highly varied country contexts by creating new asset categories of socio-economic infrastructure (World Bank, 2015).

Finally, the authorities must recognize that unquestioning belief in CPEC's potential to turn around the national future can add more loss than profit. These projects need to be look at again for equity and sustainability to assure that benefits exceed costs and that the benefits are diverted to less privileged areas and population groups. First, incongruity exists between the present level of country's labour skills and the standard needed to operate modern equipment, machines and performing better research and development activities under CPEC. Thus, essential skills based vocational trainings should be focused and where necessary may be imparted by Chinese workers on transitionally period. Moreover, due to low wage rate in Pakistan, domestic workers should be given priority when relocation of Chinese industries are made to Pakistan. Second Efforts are also needed to align the objectives of federal and provincial government bodies in order to manage Special Economic Zones (SEZs) effectively. Third market structure should be based on a competitive environment that would help invigorate the economy, improve the quality of production, and increase export revenues. Incentive based policies are needed to steer the industry's focus towards this end. Fourth, in terms of liberalization policies, the tariff structure of the economy would need an overhaul to benefit fully from the opportunities provided by CPEC. In this regard, export oriented sectors would need to be liberalized so as to welcome foreign participation and encourage innovation and quality enhancement, especially with respect to the potential Special Economic Zones (SEZs). Fifth, Pakistan must also reassess the implications of its Free Trade Agreement (FTA) with China in the light of developments under CPEC. Concessions in tariff similar given to ASEAN economies can be demanded from China. Moreover, because of high inflows of cheap Chinese products, local SMEs of Pakistan are losing ground in the domestic market. So, it is crucial to ensure that Chinese involvement in the industrial sector results in benefits for local players as well (minimum local labor force requirements for joint ventures in SEZs, for example, can be a step forward). Finally, the issue of water availability is to be addressed on priority basis in order to control the negative effects of climate change. Demand-pull factors such as increased industrial activity, more coal-based power projects, coupled with a rise in population and urbanization efforts associated with CPEC, would add significant pressures on the already vulnerable supply of water (State Bank of Pakistan, 2018).

#### **5.2 Conclusion**

Summing up, as one of the first studies in its kind, the present study contributes to sustainability in mega projects like CPEC in several ways. First, the current study proposes country specific sustainability issues as well as economic, social and environmental dimensions of CPEC as a means to sustainable development. Second, with suitable attention to local sustainable development circumstances, the proposed and validated PLS-SEM model provided rigorous economic, environmental, and social analysis of CPEC as a way to implement the SDGs in a developing country like Pakistan. Hence, the study is unique in that it probes quantitatively that how and why concern for sustainable issues together with economic, social, and environmental dimensions of CPEC impact on sustainable development. For practice, the findings of the study provide guidelines for policy makers of mega projects in developing countries. That is, the findings enable them to focus their efforts and allocating resources under mega projects efficiently in view of the *economics-sustainable policies in diverse indigenous settings* of developing countries.

#### 5.3 Limitations of the study and directions for future research

Nevertheless, the study findings should be taken with caution due to a number of limitations. Firstly, due to time constraints and hard to find and reach at appropriate respondents, the researcher was able to yield limited responses. Secondly, the findings have to be generalized to other developing countries in view of the socio-economic discrepancies between Pakistan and other developing countries. Finally, although, the current study is first attempt towards the quantification of concern for sustainable issues together with economic, social and environmental dimensions of CPEC as an instrument for attaining sustainable development goals (SDGs), however, to attain more pragmatic, and ethical solutions to local and societal problems, future research might be based on *mixed method design* (quantitative plus qualitative).

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<b>Appendix-A</b>
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Table-01: Current Literature on CPEC				
Study Author (s)	Type of Study	Main Focus		
Hali, Shukui and Iqbal	Literature Review	The study discussed the Impact of BRI on		
(2015)		CPEC.		
Ahmar (2015)	Literature Review	The study deals with the Strategic Meaning		
		of the CPEC		
Zhang, and Shi (2016)	Qualitative Delphi	This study discussed CPEC in terms of		
	Technique	social impacts and risks.		
Avais, Shaikh, Mahesar	Literature Review	The Paper discussed CPEC in terms of its		
& Memon (2016)		benefits & suggestions for its betterment.		
Ali (2016)	Literature Review	This study discussed CPEC with respect to		
		its prospects & challenges for regional		
		integration		
Ali, Gang, and Raza	Literature Review	The Study discussed CPEC in terms of		
(2016)		regional integration and prosperity.		
Aslam (2016)	Special Report	The study discussed CPEC, its obstacles,		
		and recommendations.		
Chibber (2015)	Literature review	The study focused on CPEC strategy in		
	based study	terms of the new financial institutions and		
		India's options.		
Huang, Fischer & Xu	Quantitate Survey	The study analysed the Stakeholders of		
(2016)	based	CPEC.		
Ahmed (2017)	Literature review	The study is about the missing link of the		
	based study	HRD in CPEC.		
Górski, Chaisse & Chi	Literature review	The study discussed the BRI-politics,		
(2017)	based study	international relations and economics.		
Khan (2017)	Literature review	The study discussed the cost/benefit		
	based study	analysis of CPEC in comparison with two		
		other economic corridors.		
Wolf (2017)	Literature review	This study discussed CPEC in terms of		
		regional development.		

Hussain (2017)	Qualitative	This paper discussed the CPEC in terms of
	Interview based	sustainability
Tehsin (2018)	Literature review	This study associated CPEC with
	based Study	Sustainable Economic Growth.
Billington (2018)	Literature review	The study analyses the importance of
	based Study	strategic importance of BRI for major
		stockholders.
Chawla (2017)	Literature review	This paper argues strategic importance of
	based study	ECO and CPEC for Pakistan as Regional
		and Global emerging player.
Rahman & Shurong	Literature review	The study analysed the Chinese Economic
(2017)	based study	and National Security Interests with respect
		to CPEC
Khwaja, Saeed, & Urooj	Literature review	The research is about the Environmental
(2018)	Plus Personal	Impact Assessment of road construction
	communications	activities of KPK under CPEC
	with authorities	

Table-03 CPEC Projects				
No.	Project (Energy)	Status		
1	Sahiwal 2x660MW Coal-fired Power	Completed and operated since 2017		
	Plant, Punjab			
2	Hydro China Dawood 50MW Wind	Completed and operated since April 2017		
	Farm(Gharo, Thatta)			
3	Quaid-e-Azam 1000MW Solar Park	Completed and operated since august 2016		
	(Bahawalpur) Quaid-e-Azam			
4	UEP 100MW Wind Farm (Jhimpir,	Completed and Operated since June, 2017		
	Thatta)			
5	Sachal 50MW Wind Farm (Jhimpir,	Completed and operated since April, 2017		
	Thatta)			

6	2×660MW Coal-fired Power Plants at	Expected COD, June 2018.
	Port Qasim Karachi	
7	Surface mine in block II of Thar Coal	Expected COD, December 2018
	field, 3.8 million tons/year	
8	SSRL Thar Coal Block-I 6.8 mtpa	Expected COD, End of 2018
	&SEC Mine Mouth Power	
	Plant(2×660MW)	
9	Three Gorges Second Wind Power	Expected to be completed on September
	Project	2018
	Three Gorges Third Wind Power	
	Project	
10	Matiari (Port Qasim) —Faisalabad	COD expected in 2018
	Transmission Line Project	
11	Matiari to Lahore ±660kV HVDC	Expected COD, 2018
	Transmission Line Project	
12	CPHGC 1,320MW Coal-fired Power	Expected COD, 2018
	Plant, Hub,Balochistan	
No#	Project (Infrastructure)	Status
1	KKH Phase II (Thakot-Havelian	To be completed in May 2018
	Section)	
2	Section) Peshawar-Karachi Motorway	04 out of 07 sections to be completed in
2	Section) Peshawar-Karachi Motorway (Multan-Sukkur Section)	04 out of 07 sections to be completed in 2018
2 No#	Section) Peshawar-Karachi Motorway (Multan-Sukkur Section) Project (Gawadar)	04 out of 07 sections to be completed in 2018 Status
2 No# 1.	Section) Peshawar-Karachi Motorway (Multan-Sukkur Section) Project (Gawadar) Gwadar East-Bay Expressway	04 out of 07 sections to be completed in 2018 Status Completion planned in 2018
2 No# 1. 2.	Section) Peshawar-Karachi Motorway (Multan-Sukkur Section) Project (Gawadar) Gwadar East-Bay Expressway Development of free zones	04 out of 07 sections to be completed in 2018 Status Completion planned in 2018 1 <sup>st</sup> Phase completed in December 2017.
2 No# 1. 2.	Section) Peshawar-Karachi Motorway (Multan-Sukkur Section) Project (Gawadar) Gwadar East-Bay Expressway Development of free zones	04 out of 07 sections to be completed in 2018 Status Completion planned in 2018 1 <sup>st</sup> Phase completed in December 2017. Other two phases are in progress
2 No# 1. 2. 3.	Section) Peshawar-Karachi Motorway (Multan-Sukkur Section) Project (Gawadar) Gwadar East-Bay Expressway Development of free zones Gwadar Smart Port City Master Plan	04 out of 07 sections to be completed in 2018 Status Completion planned in 2018 1 <sup>st</sup> Phase completed in December 2017. Other two phases are in progress Completion expected in August 2018
2 No# 1. 2. 3. No#	Section) Peshawar-Karachi Motorway (Multan-Sukkur Section) Project (Gawadar) Gwadar East-Bay Expressway Development of free zones Gwadar Smart Port City Master Plan Project (Other Projects)	04 out of 07 sections to be completed in 2018 Status Completion planned in 2018 1 <sup>st</sup> Phase completed in December 2017. Other two phases are in progress Completion expected in August 2018 Status
2 No# 1. 2. 3. No# 1	Section) Peshawar-Karachi Motorway (Multan-Sukkur Section) Project (Gawadar) Gwadar East-Bay Expressway Development of free zones Gwadar Smart Port City Master Plan Project (Other Projects) Cross Border Optical Fiber Cable	04 out of 07 sections to be completed in 2018 Status Completion planned in 2018 1 <sup>st</sup> Phase completed in December 2017. Other two phases are in progress Completion expected in August 2018 Status Expected to be completed during
2 No# 1. 2. 3. No# 1	Section) Peshawar-Karachi Motorway (Multan-Sukkur Section) Project (Gawadar) Gwadar East-Bay Expressway Development of free zones Gwadar Smart Port City Master Plan Project (Other Projects) Cross Border Optical Fiber Cable	04 out of 07 sections to be completed in 2018         2018         Status         Completion planned in 2018         1 <sup>st</sup> Phase completed in December 2017.         Other two phases are in progress         Completion expected in August 2018         Status         Expected to be completed during         December, 2018
2 No# 1. 2. 3. No# 1 No#	Section) Peshawar-Karachi Motorway (Multan-Sukkur Section) Project (Gawadar) Gwadar East-Bay Expressway Development of free zones Gwadar Smart Port City Master Plan Project (Other Projects) Cross Border Optical Fiber Cable Project (Rail)	04 out of 07 sections to be completed in 2018 Status Completion planned in 2018 1 <sup>st</sup> Phase completed in December 2017. Other two phases are in progress Completion expected in August 2018 Status Expected to be completed during December, 2018 Status
2 No# 1. 2. 3. No# 1 No# 1	Section) Peshawar-Karachi Motorway (Multan-Sukkur Section) Project (Gawadar) Gwadar East-Bay Expressway Development of free zones Gwadar Smart Port City Master Plan Project (Other Projects) Cross Border Optical Fiber Cable Project (Rail) Karachi Circular Railway	04 out of 07 sections to be completed in 2018 Status Completion planned in 2018 1 <sup>st</sup> Phase completed in December 2017. Other two phases are in progress Completion expected in August 2018 Status Expected to be completed during December, 2018 Status Joint Coordination Committee (JCC) of

		(CPEC) agreed for inclusion of Mass						
		Transit System as part of CPEC						
		component						
No#	Project (social Sector)	Status						
1.	Transfer of Knowledge in Different	Training workshops held on 11-18						
	Sector	October 2017						
2.	People to People Exchanges	Both sides resolved to promote Chinese						
		and Pakistani culture and heritage as a						
		way of long term partnership						

# Appendix-B

## **Research Questionnaire**

This letter requests your kind assistance in completing the attached Survey Questionnaire.

I am currently working on research project, entitled "*Evaluating the CPEC from Sustainability Perspective.*" Your assistance in completing this survey will completely confidential and be highly appreciated. Please give your most thoughtful and honest answers. The survey will take about 30 - 35 minutes to complete. All responses, once received are completely confidential and reported in summary format. If you want to receive the results of this study, please write your *Email Address* at the end of this questionnaire.

Thanks for your assistance. If you have any query about this survey, please feel free to contact via e-mail:

Prof. Dr. Masoodul Hassan (Ph.D. Business Management & Organization, Turkey) Email: masood@bzu.edu.pk

Department of Commerce, Bahauddin Zakariya University, Multan-Pakistan.

Section A: Demographic Information					
Gender					
Male Female					
Age of Respondent					
$\square$ 20 – 25 years $\square$ 26 – 30 years $\square$ 31 – 35 years $\square$ 36 – 40 years					
$\Box$ > 40 years					
Education Level					
Bachelor Master PhD Other					
Employment Status					
☐ Managerial Position ☐ Department Head ☐ Staff on an Organization					
L Other					
Please mention the name of your organization.					
Section B: Opinions of respondents about CPEC					
1. Have you ever heard about 'One Belt One Road' (BRI) Strategy or China-Pakistan					
Economic Corridor?					
1. Yes 2. No					
2. If yes, then how well do you think you understand CPEC?					
1. No Knowledge2. Some Knowledge3. Good Idea4. Plenty					
of Knowledge 5. Complete Knowledge					
3. Are you interested in CPEC?					
1. No Interest2. Little Interest3. Moderate Interest4. Some					
Interest 5. Considerable Interest					
4. Which of these categories best describes your attitude towards CPEC as the background					
described?					
1. Strongly Positive2. Positive3. Neutral4. Negative					
5. Strongly Negative					
5. To what extent do you/your institution involve over CPEC?					
1. Not at all2. Little Extent3. Moderate Extent4. Some Extent					
5. Large Extent					

Section C: Concern about Social and Environmental Issues in Pakistan					
Please rate the following items according to $1 =$ Not at all concerned,	2=S	light	ly co	nceri	ned,
3= Moderately concerned, 4= Very concerned, 5= Extremely concern	ned	r –		r	1
Air Quality	1	2	3	4	5
Climate Change (Change in Mean Rainfall, Risk of Flooding)	1	2	3	4	5
Water Quality & Sanitation	1	2	3	4	5
Availability of Clean Drinking Water	1	2	3	4	5
Water Resources Consumption	1	2	3	4	5
Underground Water Depletion	1	2	3	4	5
Deforestation (Removal of Forest & Trees)	1	2	3	4	5
Threat to Species	1	2	3	4	5
Energy Usage & its Efficiency	1	2	3	4	5
Renewable Energy Use		2	3	4	5
Energy Demand Management	1	2	3	4	5
Accessibility to Electricity	1	2	3	4	5
Area of Agriculture & Green Spaces for Public usage	1	2	3	4	5
Urbanization	1	2	3	4	5
Section D: Potential Environmental, Social & Economic Impacts	of C	PEC	1		
Please rate the following items according to 1= Strongly Negative	e Imp	oact,	2= ]	Nega	tive
Impact, 3= No Impact, 4= Positive Impact, 5= Strongly Positive Impact	act	-		-	
Employment Rate	1	2	3	4	5
Transportation Convenience	1	2	3	4	5
GDP Growth Rate		2	3	4	5
The Annual Revenue from Toll Collection	1	2	3	4	5
Gross Revenue of Gwadar Port & Free Trade Zones		2	3	4	5
Gross Revenue of Special Economic Zones (SEZs)	1	2	3	4	5
Foreign Direct Investment & Local Investment through SEZs.	1	2	3	4	5
Ease of doing Business (EODB) Indicators	1	2	3	4	5
Export focused Global Enterprises in the SEZs.		2	3	4	5
Joint Ventures of International Enterprises with Local Industries	1	2	3	4	5
Relative Position of Local Industries in Supply Chain	1	2	3	4	5
Use of Supper Critical Technology & Environmental Safe Guards		2	3	4	5
Railway line & Motorways		2	3	4	5
Energy Projects	1	2	3	4	5
Industrial Parks & Trade Zones	1	2	3	4	5
Evacuated Energy of Thar		2	3	4	5
Un gradation of Transmission System of Electricity		2	3	4	5
Balanced Regional Development		2	3	4	5
Fiber optic cable from Gilgit-Baltistan. Khyber Pakhtunkhwa to					
Rawalpindi		2	3	4	5
Hydel Projects	1	2	3	4	5
Development of less developed Provinces		2	3	4	5
Transport, energy & industrial parks	1	2	3	4	5
Poverty level (less developed provinces)	1	2	3	4	5
Hunger Level	1	2	3	4	5

Health & Well-being of People		2	3	4	5
Education level (Less developed provinces)		2	3	4	5
Gender Equality		2	3	4	5
Clean & Affordable Energy		2	3	4	5
Decent work & Economic Growth		2	3	4	5
Industry, Innovation, & Infrastructure		2	3	4	5
Reduction in Inequality		2	3	4	5
Sustainable Cities & Communities		2	3	4	5
Responsible Consumption & Production		2	3	4	5
Climate Action		2	3	4	5
Life under Water		2	3	4	5
Life on the Land		2	3	4	5
Peace Justice & Strong Institutions		2	3	4	5