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RESEARCH PAPER

China-Pakistan Economic Corridor and Climate Change: The Mediation Role of Tourism Development

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ABSTRACT

This research aims to explore the role of China Pakistan Economic Corridor (CPEC) on tourism development and tourism development on climate change. In addition, the study also examines the mediating role of tourism development on the relationship between China Pakistan Economic Corridor and climate change. The study employed "Partial Least Square Structural Equation Modeling Approach" and results from the structural analysis suggest that CPEC significantly influences tourism development and tourism development in return significantly contributes to climate change. Moreover, tourism development partially mediates the relationship between CPEC and climate change. The findings of this study extend the understanding of CPEC and Tourism development in the context of climate change and offer implications for policy makers and other stake holders to minimize the destruction of climate change in future

Introduction

China and Pakistan Economic corridor (CPEC) projects have unique significance from economic, political and geo strategic point of view. Further, many projects for improvement and construction of network of roads and railways tracks for example Peshawar Karachi highway, Indus high way and ML1 projects under CPEC projects in Pakistan. Recently, many studies have highlighted the challenges of CPEC (Wolf, 2017) and its importance for the region (Noonari & Memoon, 2017: Hussain & Khan, 2017; Azhar, Khan & Shah, 2019). Similarly, some studies have underlined the development (Hali, Shukui & Iqbal &2015; Menhas et. al, 2019). The positive externalities of the CPEC includes the improvement in infrastructure facilities (Ahmed & Mustafa, 2016), employment/entrepreneurship opportunities (Kanwal et.al, 2019) in Pakistan. In addition, it ultimately creates various

opportunities i.e. employment and business, etc. However, environmental decay and hazards (Ali, 2018; Saad, Xinping & Ijaz, 2019) and biodiversity loss (Nabi et. al, 2017, Yaseen, et. al. 2017, Muzaffar, et al.2018 & Rahim et.al, 2018) are the major threats associated with CPEC projects.

Gilgit- Baltistan region is famous due to its geographical location and tourist destination among local and foreign tourists. The large inflow of the tourist to the region is due to improvement infrastructure facilities and improvement in law and order situation in the region. In addition, tourist police is established to take care of the security of the tourists in the area. However, a bulk number of tourists have created many problems and environmental decay is the key problems for the area. The studies for example (Shi et al., 2019) have also shown that environmental pollution is the key concerned of tourism related activities. The mountains areas have great potential of tourism and improving the local economy while its adverse effects on environment undermine its positive effects (Nepal, 2000). The studies have shown that "the raise in tourism activities increases the energy consumption and it causes land degradation" (Eyuboglu & Uzar, 2019). Similarly, tourism related activities i.e. transportation etc. contributes in 4.4 % of the CO_2 emissions (Peeters & Dubois, 2010) and major determinants of air pollution are transportation and aviation industry (Peeters, Szimba, & Duijnisveld, 2007). Lastly, "Tourism development is a contributor to energy consumption and climate change" (Katircioglu, 2014).

Recently, due to Geo-political and economic importance of CPEC many studies have been conducted focusing on economy, environment and society etc. Some studies have discussed the various challenges for example security (Ibrar, Mi, Rafiq &Karn, 2016; Chaziza, 2016& Jamal, 2014) related to CPEC. Similarly, the other studies have highlighted the economic (Hussain & Hussain, 2017; Jadoon, Khan, Khan & Chi, 2017;Hussain & Khan, 2017) and social significance of the CPEC.The recent study of Saad, Xinping and Ijaz (2019) also showed that CPEC is contributing in employment, business and poverty while its effects on education and environment is insignificant. In contrast to earlier studies, the present study is conducted in the Gilgit-Baltistan which is gateway of CPEC and famous for mountain tourism around the globe and has geo political and economic importance due to its geo graphical location. Therefore, this research mainly studied the effects of CPEC on climate change and mediating role of tourism in Gilgit-Baltistan. It is important to mention here that, "weather and climate are important factors in the tourism industry, and air quality is an integral aspect of weather and climate" (Zhang, Hou, Li & Huang, 2019). The data for this study is acquired from the Baig and Imtiaz (2019) and for empirical analysis, the present study used Partial Least Square and data is analyzed in SmartPLS3. This study has unique significance for the policy makers of the Gilgit-Baltistan in particular and Pakistan in general because climate change is the major challenge around the globe. Likewise, majority of the earlier research focuses time series analysis and limited research on primary data. Therefore, this research would fill this gap and have contribution in academic

literature, which further attracts researchers to carry out studies on various economic activities and its effects on climate change at local level.

The organization of the proposed is as follows, introduction and review of literature has been discussed in first and second part of the study. Similarly, third section is about the research methodology and results are discussed in the fourth section. Lastly, the whole study is concluded and policy implications are given is last sections.

Literature Review

Economic growth requires energy and which ultimately enhances CO_2 (Eyuboglu & Uzar, 2019). Furthermore, tourist arrivals are another element while the key factor that increases CO2 emission is energy. More importantly, land degradation is the ultimate outcome of the tourism related actions in Tukey. Lastly, the author's results shown bidirectional causality among tourist, energy, $C0_2$ and growth.In contrast to earlier studies, Tugcu and Topcu (2018) explored the effects of co2 on tourism receipts. Their results reveal that liquid fuels consumption is negatively affecting the tourism receipts. However, countries with higher GDP have more potential to provide variety of services i.e. transportation and accommodation to tourist. Finally, tourist can be attracted by stabilizing prices and currency. Similarly, on one hand tourism is contributing in economy positively while it has major role in co2 emission in both short and long run (Katircioglu, 2014). In addition, Zhang and Liu (2019) study concludes, "Tourism development leads to environmental degradation".

However, Fayaz et.al (2018) found that the tourism and environment nexus vary in various provinces of the China. In Xinjiang the quality of the environment due to tourism and decline in co2 emissions. Shakouri, Yazdi and Ghorchebigi (2017) also confirmed "tourism-induced EKC hypothesis" in Asia Pacific countries. Similarly, (Sghaier, Guizani, Jabeur& Nurunnabi 2018) observe the varying relation between environmental quality and tourism. In Egypt, tourism has negative influence on the quality of the environment, while positive effect is found in Tunisia and in Morocco, the effect is neutral. Likewise, Azam, Alam and Hafeez (2018) also observed that tourist inflow contributes in consumption of energy and pollution in Malaysia and found contrary effect in case of Singapore. Their findings show that in Singapore "Environmental Kuznets Curve hypothesis" are not effective. The recent study of (Nepal, Irsyad & Nepal, 2019) showed that the factors, which negatively affect tourist arrival, are consumption of energy. Therefore, the researcher put emphasis on "energy efficiency and diversity" and sustainable tourism.

In particular, economic growth is positively related with tourism but also have a negative influence on the environment (Paramati, Alam & Chen, 2016). However, it is obligatory to investigate whether the negative impacts of tourism still exist in the presence of more environment friendly policies and strategies in the recent years. The international tourism is gaining importance in many economies of

the world. Accordingly, if we look into the literature, we can find a stream of studies, which intends to measure how much tourism impacts on the environment. In context of Pakistan, Sekrafi and Shgaier (2018) found that a significant increase in carbon emission due to tourism indicators and unidirectional causality between tourism and carbon emission. Sharif et al. (2017) found unidirectional causality between tourist arrival and CO_2 emission.

Contrary to the fact that tourism influenceCO_2 emission, tourism industry is contributing in economy of the countries around the world. Researchers believe on the trickledown effect of tourism development on overall economic growth of the economy of any country (Lee & Chang, 2008). The bottom line of the previous studies can be summarized as, "economic and environmental impacts can be minimized if tourism development is thoroughly well planned and controlled in line with the principles of sustainable tourism" (Nepal, Irsyad & Nepal, 2019).The contribution of tourism is 75% out of total tourism emissions (UNWTO, 2007). Therefore, "technological innovation in transportation needs to be strengthened, such as using energy efficient airplanes and high-speed rails" (Zhang & Liu, 2019).

Material and Methods

The present research utilizes "Partial Least Square Structural Equation Modeling (PLS-SEM)", for testing the hypothesis of the study. Recently, this methodology is popular and has been used extensively in social sciences, marketing and management for multivariate analysis like (Hair et al., 2019; Aman et al., 2019; Ali, Kim & Ryu, 2016). Our model consists three latent constructs i.e. CPEC with ten observed variables, Tourism Development (TOUD) with eight items and Climate Change (CLCH) with four indicators (see table 1). Conceptual model of the study and the hypothesized relationships among exogenous and endogenous latent constructs are given in figure 1 as under:

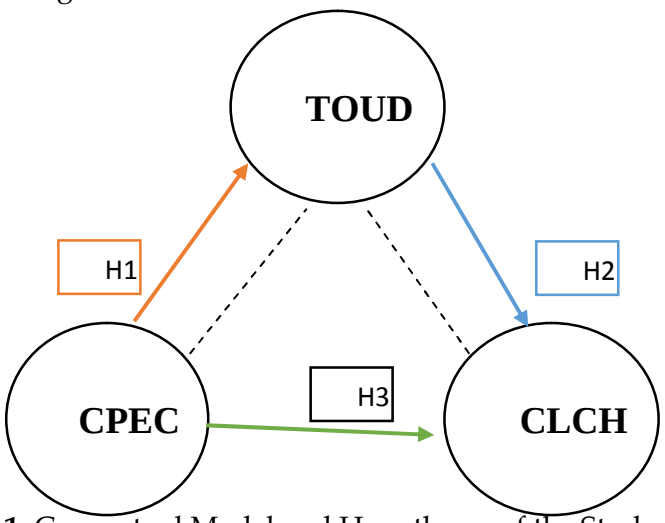

Figure 1. Conceptual Model and Hypotheses of the Study

Research Hypotheses

H1: China Pakistan Economic Corridor (CPEC) positively contribute to tourism development (TOUD)

H2: Tourism development (TOUD) positively contribute to Climate Change (CLCH)

H3**:** Tourism development (TOUD) (mediate) the relationship between China Pakistan Economic Corridor (CPEC) and Climate Change (CLCH).

The study proposed PLS-SEM technique to explore the relationships among CPEC, Tourism development (TOUD)and Climate Change (CLCH) in Pakistan. PLS-SEM is a multivariate statistical method that evaluates both measurement and structural model in order to find the relationships between study constructs and their observed indicators and among the latent constructs simultaneously (Hair, Hult, Ringle, &Sarstedt, 2013). In our model, we introduced tourism development (TOUD) as a mediator variable to examine its indirect role on the direct relationship between CPEC and Climate Change (CLCH) in Pakistan. In addition, the study identified influencing factors CPEC, Tourism development (TOUD) and Climate Change (CLCH) after an extensive literature review. Finally, we developed ten items forCPEC, eight items for Tourism Development (TOUD) and four items forClimate Change (CLCH). Lastly, the study used secondary data of Baig and Imtiaz (2019) for the observed indicators of CPEC, Tourism Development (TOUD) and Climate Change.

Validity and reliability

Table 1 reports Cronbach's alpha, "Average Variance Extracted (AVE), outer Loadings and Composite Reliability (CR)" for the confirmation of constructs internal consistency. Table 2 given below showed that except some items all other items loadings surpassed the suggested value of 0.70. Items having weaker loadings than the recommended value were assessed for the composite reliability of the construct and deletion of such items from the construct did not show any improvement in the composite reliability, therefore they are retained in the construct (Hair et al., 2013).

Table 1
Validity and reliability of constructs

Constructs	Items	Outer loadings	Cronbach's Alpha	rho_A	CR
CLCH	CLCH1	0.69	0.712	0.718	0.818
	CLCH2	0.703			
	CLCH3	0.741			
	CLCH4	0.774			
CPEC	CPEC1	0.514	0.855	0.866	0.884

	CPEC2	0.669			
	CPEC3	0.749			
	CPEC4	0.747			
	CPEC5	0.779			
	CPEC6	0.508			
	CPEC7	0.532			
	CPEC8	0.749			
	CPEC9	0.695			
	CPEC10	0.605			
TOUD	TOUD1	0.568	0.71	0.725	0.794
	TOUD2	0.657			
	TOUD3	0.529			
	TOUD4	0.459			
	TOUD5	0.537			
	TOUD6	0.610			
	TOUD7	0.532			
	TOUD8	0.665			

Results and Discussion

Later, the study carried out collinearity test and Table 2 shows the VIF values for the predictors and the values are within the guidelines of the Hair et al. (2013, 2017) i.e. the values should be 5 or lower. In sum, the Smart PLS results in Table 2 shows that the values of VIF are less than five, indicating the absence of Multicollinearity.

Table 2
Collinearity assessment (Inner VIF values)

Constructs	CLCH	CPEC	TOUD
CLCH			
CPEC	1.26		1
TOUD	1.26		

Mediation Testing

Three basic conditions are required for variable to act as a mediator (Hair et al., 2013)**.** First, the direct relationship between dependent and independent variable must be significant without including the mediator. It implies that direct path relationship from CPEC to Climate Change (CLCH) must be significant without including Tourism Development (TOUD). Second, after introducing mediator in the model there should have a significant relationship between the between dependent, mediator and explanatory variables. It means that indirect relationship between CPEC-TOUD-CLCH must be significant. Significance level of relationships among different variables in a model is tested through the calculation

of beta (β) and associated (t) and (p) values. Results reported in table 3 revealed that our mediation model fulfilled first two crucial conditions for mediation analysis. The direct effect from CPEC to CLCH without including TOUD is highly significant (β = 0.263, t = 6.423 and p = 0.000). The indirect effect from CPEC - TOUD - CLCH (after including mediator TOUD) is also significant at 1% (β = 0.156, t = 4.618 and p = 0.000). Lastly, the study assesses the nature of mediation i.e. full mediation, partial mediation and no mediation via assessing Variance Accounting For (VAF) method. The value of VAF is higher than 80 % which indicates the shows full mediation while the value between 20 and 80 % show Partial mediation. Lastly, less than 20 % of VAF value indicates no. mediation (see mediations analysis portion for details).

Table 3
Mediation Test Results

Constructs	Beta(β)	t-Value	p-Value
CPEC → CLCH	0.263	6.423	0.000*
CPEC → TOUD → CLCH	0.156	4.618	0.000*

Notes: *(P < 0.01); **(P < 0.05)

Structural estimates (Hypotheses Testing)

Significance of hypotheses in a model is tested through the calculation of beta (β) value. The slope coefficient Beta (β) in a model shows the variation in the dependent variable due to a unit change in independent variable. To test whether Beta (β) value is significant or not we use t-test and p-value. Table 4 given below shows analysis of the structural model i.e. proposed hypotheses and their decisions along with Beta (β), (t) and (p) values (also see Figure 2).

Table 4
Hypotheses testing

Hypotheses	Beta	t-Value	p-Value	Decision
CPEC → TOUD	0.454	7.63	0.000*	Supported
TOUD → CLCH	0.343	6.192	0.000*	Supported
CPEC → TOUD → CLCH	0.156	4.618	0.000*	Supported

Notes: *(P < 0.01); **(P < 0.05)

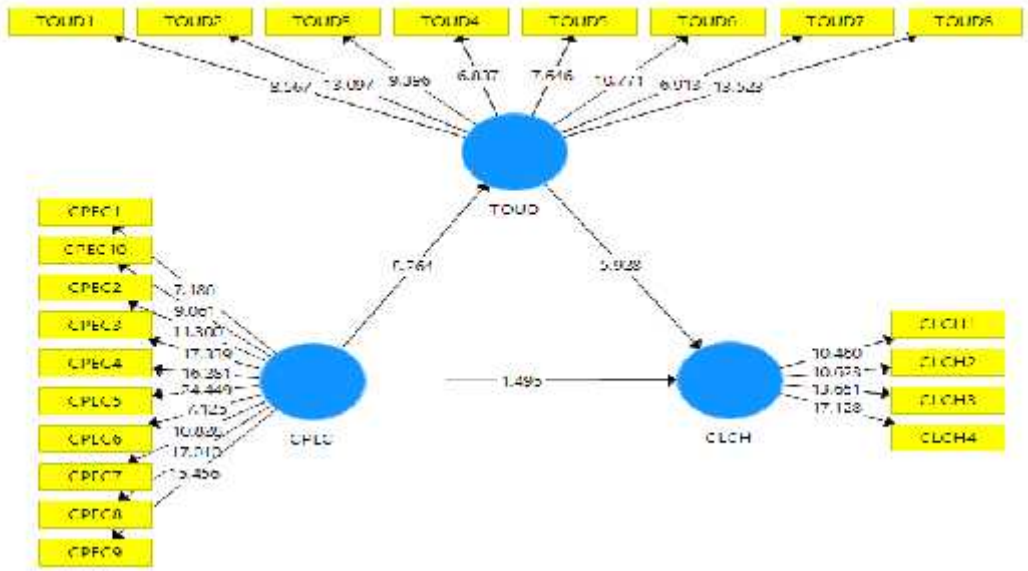

Figure 2PLS-SEM Bootstrapping (Structural Model)

The results reported in table 8 revealed that CPEC has a significant positive impact on Tourism Development (H1) i.e. (β = 0.454, t = 7.36 and p = 0.000). Thus, the outcomes supported our hypothesis 1. Similarly, the results also supported hypothesis 2, which stated that Tourism Development (TOUD) has a significant positive impact on Climate Change (β = 0.343, t = 6.192 and p = 0. 000. Thus on the basis of study results, we conclude that CPEC positively contribute to tourism development and tourism development positively contributes to climate change in Pakistan.

Mediation Analysis

The Smart PLS-SEM results also endorsed our hypothesis (H3) which stated that Tourism Development (TOUD) mediate the positive relationship between CPEC and Climate Change (CLCH) in Pakistan. The results of the indirect effect from CPEC-TOUD-CLCH (β = 0.156, t = 4.618 and p = 0.000) in table 7 supported this hypothesis. The value of VAF is 0.62, which shows partial mediation (Hair et al., 2013). So, based on VAF result (0.62) we conclude that Tourism Development (TOUD) partially mediate the positive relationships between CPEC and Climate Change (CLCH).

Effect Size (f^2)

According to the Hair et al. (2013) p-values shows the association between explained and explanatory variable and do not shows the size effect. The results of the size effects are given in Table 5. The f^2 value has strong, moderate and weak effect at 0.35, 0.15 and 0.02 respectively (Cohen, 2013). The results reported in Table

8indicated that CPEC directly has a negligible effect on climate change (f^2=0.08) but it has a moderate effect (f^2=0.26) on tourism development. This tourism development in return has a moderate effect (f^2=0.11) on climate change.

Table 5
Effect Size (f^2)

Constructs	CLCH	CPEC	TOUD
CLCH			
CPEC	0.008		0.26
TOUD	0.11		

Model's Predictive Relevance (Q^2)

It is evident from Q^2 value given in fig. 3, that the endogenous variables of the current study have acceptable values of predictive relevance.

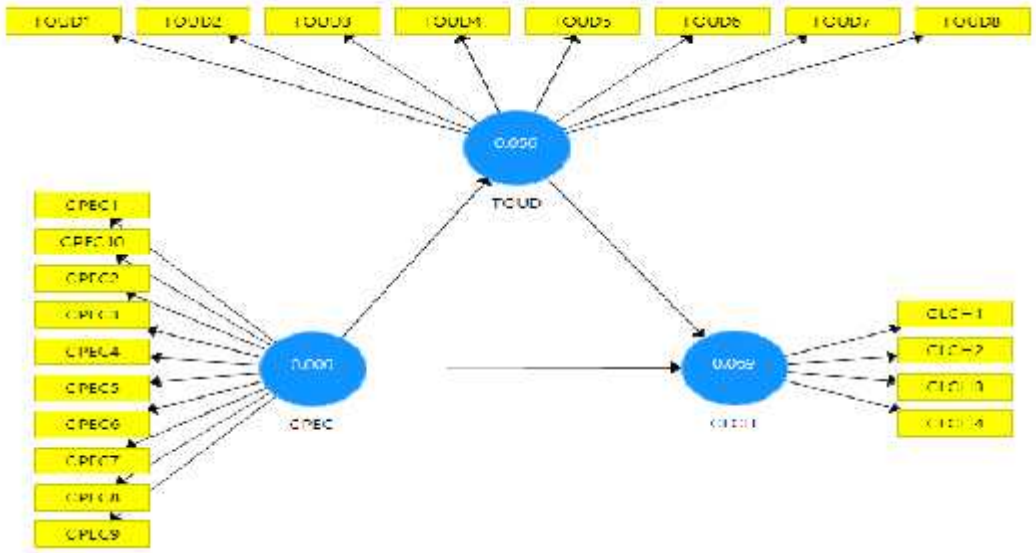

Figure 3. PLS-SEM Blindfolding (Construct Cross Validated Redundancy)

It is evident from the study results that CPEC does not contribute to climate change directly (β = 0.092, t = 1.495) but it has a significant positive impact on tourism development (β = 0.454, t = 7.36) which in return contributes to climate change (β = 0.343, t = 6.192) significantly. The indirect effect of CPEC on climate change through tourism development (β = 0.156, t = 4.618) has a significant positive impact on climate change. Several studies have discussed the negative externalities from tourism on environment for example Zhang and Liu (2019) Katircioglu (2014) etc. According to the researchers, Eyuboglu and Uzar (2019) tourist arrival a factor of CO2, which further enhances environmental pollution. Similarly, Azam, Alam and Hafeez (2018) also showed that tourism enhances pollution. The outcomes of

the PLSM has revealed that CPEC does not contribute to climate change in contrast to the research of (Ali, 2018; Saad, Xinping & Ijaz, 2019) who argues that environmental pollution is the main concerned of CPEC projects. However, the study results are consistent with (Sekrafi & Shgaier, 2018, Muhammad et. al, 2019) which also showed that tourism is contributing pollution in Pakistan. Therefore, there is need to reduce the adverse effects of the tourism on emissions (Sharif, Afshan & Nisha, 2017).

Conclusion

The initiatives under CPEC have many direct and indirect impacts on the economy, development and business opportunities in Pakistan. Similarly, the security situation has been improved in Pakistan, which has attracted many foreign tourists and improved the domestic tourism. The large influx of the domestic tourist to Gilgit-Baltistan is mainly due to expansion of Karakoram High way (KKH) and construction on tunnels. Therefore, this study aimed to inspect the effects of CPEC on climate change and studied the mediating role of tourism development. To achieve the given objectives of the research the researcher utilizes the Partial Least Method and data is acquired from Baig and Imtiaz (2019). The findings of the study have shown that tourism mediates the relationship between CPEC and climate change. Therefore, the study suggests, "the policy-makers should put higher attention to reduce pollution" (Shakouri et al., 2017). Lastly, the policy makers should focus on "promoting the development of sustainable tourism since the environment-friendly tourism is suggested to be the only acceptable one" (Satrovic & Muslija, 2019).

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