

## Road and transport infrastructure development and community support for tourism: The role of perceived benefits, and community satisfaction

Shamsa Kanwal<sup>a</sup>, Muhammad Imran Rasheed<sup>b,c</sup>, Abdul Hameed Pitafi<sup>d,\*</sup>, Adnan Pitafi<sup>e</sup>, Minglun Ren<sup>d</sup>

<sup>a</sup> School of Public Affair, University of Science and Technology of China, Hefei, China

<sup>b</sup> School of Management, University of Science and Technology of China, Hefei, China

<sup>c</sup> Department of Management Science, Islamia University Bahawalpur, Pakistan

<sup>d</sup> School of Management, Hefei University of Technology, Hefei, China

<sup>e</sup> Mehran University Institute of Science, Technology and Development (MUISTD), Mehran University of Engineering & Technology Jamshoro Sindh, Pakistan

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### ABSTRACT

This study investigates the impact of road and transportation infrastructure on community support for tourism in the context of the China-Pakistan economic corridor (CPEC), a multi-billion-dollar mega project. Utilizing social exchange theory, the authors examined a positive relationship between perceived impact of road and transport infrastructure development and local community support for tourism through perceived environmental impact, perceived tourism benefits, and perceived community satisfaction. The data was collected through an online survey from 350 people living along the CPEC route in Pakistan. Results revealed that perceived impact of CPEC road and transport infrastructure is positively related to community support for tourism, and perceived tourism benefits and community satisfaction play a mediating role in this relationship. Findings of this study not only contribute to the tourism literature, but also provide significant implications for officials to develop policies for promoting tourism development.

### 1. Introduction

Road and transportation infrastructure plays an important role in tourism industry development (Khadaroo & Seetanah, 2007; Masson & Petiot, 2009). Road and transport infrastructure provides easy access to tourism destinations and increases business activities in the region that have a positive effect on the local community's standard of living. Scholars have suggested that road and transport infrastructure not only plays a vital role in enhancing existing tourism activities, it also promotes the development of new tourism sites in the region (Currie & Falconer, 2014; Musa & Ndawayo, 2011; Virkar & Mallya, 2018). A recent study suggested that road and transport infrastructure in a country attracts tourists and can promote tourism destinations (Virkar & Mallya, 2018). Indeed, past research has suggested a positive relationship between road infrastructure and tourist activities (Khadaroo & Seetanah, 2007; Liu & Shi, 2017), which increases the flow of tourism development (Kanwal, Pitafi, Pitafi, et al., 2019; Nazneen, Xu, & Din, 2019). For example, Kurihara and Wu (2016) and Li, Yang, and Cui

(2019) found that high-speed train service has significantly increased the volume of tourism in Japan and China, as rapid mass transport facilitates the movement of individuals across tourist destinations. Similarly, Virkar and Mallya (2018) highlighted several parameters related to tourist satisfaction, including transportation infrastructure and service quality, and argued that transport infrastructure is a significant predictor for tourism development. Specifically, road and transport infrastructure eases the travel of tourists and facilitates movement within destinations (Lohmann & Duval, 2011).

With the development of CPEC, it is expected that northern areas of Pakistan, particularly the Gilgit Baltistan and Khyber Pakhtunkhwa (KPK) provinces, will become tourism hubs in the country. These areas consist of several tourism sites, including the world's highest mountain range (Himalaya and Hindukush), with glaciers, resorts, lakes, and other beautiful natural locations that may attract tourists from around the world. Despite these exquisite tourism sites, the areas are undeveloped and currently lack a good road and transportation infrastructure. Roads constructed in the CPEC project will pass through these areas and are

\* Corresponding author.

E-mail addresses: [shamsa@mail.ustc.edu.cn](mailto:shamsa@mail.ustc.edu.cn) (S. Kanwal), [emrnsrashed@hotmail.com](mailto:emrnsrashed@hotmail.com) (M.I. Rasheed), [hameedpitafi@hotmail.com](mailto:hameedpitafi@hotmail.com) (A.H. Pitafi), [adnanpitafi@gmail.com](mailto:adnanpitafi@gmail.com), [adnan.pitafi@faculty.muett.edu.pk](mailto:adnan.pitafi@faculty.muett.edu.pk) (A. Pitafi), [renml@hfut.edu.cn](mailto:renml@hfut.edu.cn) (M. Ren).

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expected to attract a high number of international tourists (Today, 2016). The arrival of a great number of tourists is likely to promote tourism activities in these areas, including the construction of hotels, restaurants, and related businesses. Such activities may have a significant impact on the local residents living in these areas. We, therefore, assume that the perceived impact of road and transportation infrastructure development may be related to local residents' support of tourism in the area.

Research suggests that road and transport infrastructure development generates employment opportunities, enhances business activities, and brings several other benefits for the local community (Kanwal, Pitafi, Rasheed, Pitafi, & Iqbal, 2019e; Park, Nunkoo, & Yoon, 2015; Wang & Pfister, 2008). Road and transport infrastructure development can, therefore, create positive perceptions in the local community around the benefits of tourism, which may subsequently generate positive support in the local community for tourism in the area. The benefits associated with road and transport infrastructure development may further result in community satisfaction. Conversely, the development of road and transport infrastructure may generate a negative environmental impact, as traffic congestion, overcrowding, noise, air pollution, and damage to the natural beauty are possible negative consequences of road and transport infrastructure development (Kanwal, Pitafi, Rasheed, et al., 2019; Nunkoo & Ramkissoon, 2011a; Park et al., 2015). A perceived negative environmental impact can, therefore, be negatively related to community support of tourism development.

Past research has investigated the relationship between infrastructure development and local residents' support using different mechanisms, including community attachment, place attachment, and sense of community (Andereck & Vogt, 2000; Gursoy, Chi, & Dyer, 2010; Gursoy, Jurowski, & Uysal, 2002; McGehee & Andereck, 2004). Surprisingly, road and transport infrastructure development and its relationship with community support for tourism have been given less attention (Nazneen et al., 2019). Addressing this important research gap, the objective of the current study is twofold; (i) to investigate the relationship between road and transport infrastructure development and community support for tourism, and (ii) to explore the underlying mechanisms in this relationship through different paths. This study, therefore, makes substantial contributions in tourism literature. For instance, this study empirically investigates the relationship between road and transport infrastructure development and local community support for tourism in the context of CPEC. Second, this study explores the dual paths (positive and negative) through which road and transport infrastructure development may be related to community support for tourism. Third, this study carries several important implications for policymakers regarding tourism development in the areas of CPEC. Fig. 1 explains our theoretical model.

The remainder of the study proceeds as follows. Section two briefly

elaborates the theoretical background, including a literature review of existing research and social exchange theory. Based on previous literature, the authors develop the hypotheses of the study. The third section describes the research method. Section four reports different analysis techniques and results, and the last section includes discussion, implications, and limitations of the study.

## 2. Theoretical background and hypotheses development

### 2.1. Social exchange theory

Social exchange theory (SET) is widely used in research for investigating local community benefits, attitudes, and support towards development (Ali et al., 2018; Ap, 1992; Kanwal, Chong, & Pitafi, 2019b; Kanwal, Pitafi, Rasheed, et al., 2019; Yoon, Gursoy, & Chen, 2001). Specifically, SET provides a conceptual framework for understanding the social exchange process among individuals and groups. Applying SET, recent research has explored the impact of CPEC development on the local community in different contexts. For example, Ali et al. (2018) found that local community support for CPEC development is determined by perceived benefits such as economic, environmental, and educational factors. Kanwal, Pitafi, Rasheed, et al. (2019) utilized SET in their recent research aimed at investigating community support of development projects and found that positive effects associated with road and transport infrastructure development are a strong predictor of community support for road and transport development. Lee, Kim, and Kim (2018) utilized the framework of SET and argued that the local community's positive attitude is important for community support for the development process. SET implies that individuals are likely to support the development process when they perceive that they are likely to obtain advantages from it. If the local community perceives the benefits are high, they will be motivated to engage in the exchange process and will, therefore, provide their support of the development process (Gursoy et al., 2002, 2010). Individuals assess the exchange of resources relative to the benefits connected with the exchange process (Yoon et al., 2001). From a tourism perspective, we can assume that if the local community perceives that benefits are associated with the road and transport infrastructure development, they will provide their support to tourism in the area and will be actively involved in this process.

### 2.2. Road and transport infrastructure and community support for tourism

Tourism management scholars suggest that tourists' favorite destinations are characterized by the "6 A's" – attractions, amenities, access, assemblage, accommodation, and ancillary services (Della Corte, Piras, & Zamparelli, 2010). Access to tourism locations through road and other

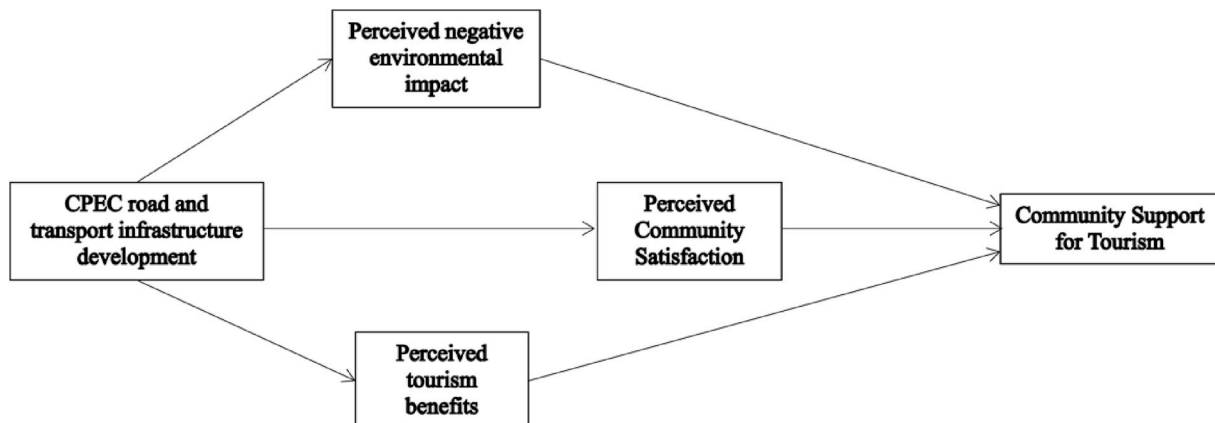


Fig. 1. Conceptual Model.

transport infrastructure is an vital part of tourism development. A location cannot be enjoyed if it is difficult to reach due to insufficient roads and other transportation infrastructure. In addition, improved road and transport infrastructure reduces the time and cost associated with travel (Kanwal, Pitafi, Ahmad, et al., 2019). Past research has found that transportation modes such as roads, trains, and air have a positive impact on tourism activities (Kurihara & Wu, 2016; Li et al., 2019; Masson & Petiot, 2009). Scholars of tourism management suggest that visitors from developed countries where most of the citizens are habitual users of modern transportation infrastructure (Khadaroo & Seetanah, 2007) desire to enjoy facilities similar to what they have at home (Mo, Howard, & Havitz, 1993). If the preferred tourism site is characterized by poor road and transportation infrastructure, high prices, and an uncomfortable journey, then even those aspiring to visit will seek alternative tourism destinations. Therefore, better road and transportation is suggested as an essential predictor of tourism activities (Khadaroo & Seetanah, 2007). The above debate indicates that road and transport is a potential factor in tourism development. Nevertheless, to date, research studies on the significance of road and transportation for expansion of the tourism industry are rare in literature, thus creating room for this study.

### 2.3. Perceived environmental impact, benefits, and community satisfaction

The China-Pakistan economic corridor (CPEC) is a mega project under construction in Pakistan. China is investing more than 60 billion USD in Pakistan on several projects under the umbrella of the CPEC initiative (Kanwal, Pitafi, Rasheed, et al., 2019). CPEC is aimed at linking the Gwadar port in Pakistan's Baluchistan province to Khunjerab City at the Pakistan-China border through a 3000-km network of roads, railways, and pipelines. This modern road network, aimed at enhancing trade activities in the region, will pass through Pakistan, including world-famous locations in the KPK and Gilgit Baltistan provinces. The development of road and transport infrastructure through CPEC is likely to affect the local community. Residents may perceive both positive and negative effects associated with this development; for instance, the local community may perceive positive economic benefits associated with CPEC development such as enhanced business activities in the region. This may include the arrival of more tourists in the area from around the world. The arrival of tourists will likely enhance economic activities in the region and result in development of new businesses, including hotels, restaurants, markets, and transportation. Research has shown that the positive benefits associated with tourism activities exert a positive impact on tourism development (Kang & Lee, 2018; Rasoolimanesh, Ringle, Jaafar, & Ramayah, 2017). Tourism scholars, for instance, Perdue, Long, and Kang (1995) argue that the local community supports tourism development, as people perceive positive benefits associated with tourism activities. Moreover, infrastructure and tourism development improve the local community's living standard (Kanwal, Pitafi, Rasheed, et al., 2019; Zhu, Liu, Wei, Li, & Wang, 2017). Infrastructure development benefits the local community in several ways; for example, better road transportation infrastructure provides the local community with access to big cities, where they can access education, health, and other facilities. Past research suggests that investing in road and transportation infrastructure development such as highways, train tracks, and air can generate a beneficial tourism business environment in the region (Andereck & Nyaupane, 2011). We assume that the positive impact associated with road and infrastructure development is likely to acquire more support from the local community for tourism in the region. Our assumption is consistent with social exchange theory, which implies that as a result of social exchange, people will exert their support of tourism as they perceive positive benefits associated with the road and infrastructure development. Here, we theorized that;

**H1a.** There is a positive relationship between the CPEC road and

transport infrastructure development and perceived tourism benefit.

Environmental impact is associated with environmental changes and nature protection efforts in the area (Zhang, Cole, & Chancellor, 2013). People are likely to perceive a negative environmental impact associated with road and transport infrastructure development, as such development generates environmental disturbances. For example, air and noise pollution, damage to natural resources such as rivers, cutting of forests and trees, changes in wildlife movement, and increased garbage and human waste are possible negative impacts (Kanwal, Pitafi, Rasheed, et al., 2019).

Past research on road and transportation has highlighted several negative environmental effects. For example, heavy transportation generates carbon emissions, creates noise pollution, damages air quality, and generates traffic problems (Davis, 1997; Lv, Liu, Yang, & Liu, 2019). Cutting of forests and blasting of mountains also affect the environment in the area. Yang, Li, and Cao (2015) contend that an increase in transportation results in greater production of carbon dioxide (CO<sub>2</sub>), which generates pollution in the environment. Construction activities affect water quality with the deposition of dust, disposal of debris, and rock blasting. Groundwater could be at risk of contamination when de-icing chemicals are used to melt down the snow during construction in winter. In the context of CPEC road projects, around 7000 trucks per day will cross northern areas of Pakistan, leading to the creation of around 36.5 million tons of carbon dioxide (CO<sub>2</sub>) in the environment (Nabi, Ullah, Khan, Ahmad, & Kumar, 2018). Such massive CO<sub>2</sub> emissions will severely damage glacier mass and result in tremendous flooding (Nabi et al., 2018). This led us to assume that road and transport infrastructure development may result in a perceived negative environmental impact. Therefore, we hypothesized that;

**H1b.** There is a positive relationship between the CPEC road and transport infrastructure development and perceived negative environmental impact.

Local community satisfaction is another element affecting the host community's supportive behavior towards tourism development. Scholars have suggested that the host community's positive response towards tourism development is important for local community satisfaction (Ekicia & Cizelb, 2014; Uysal, Sirgy, Woo, & Kim, 2016). Indeed, local community satisfaction is crucial in development projects; for example, Ko and Stewart (2002) state that local community satisfaction is related to positive tourism effects perceived by the local community. Past research suggests that road and transportation significantly improves local residents' living standard (Ali, Mi, Shah, Khan, & Imran, 2017), and further, the increased infrastructure enhances the economy and status of local residents. In addition, research studies on CPEC indicate that the road and transport infrastructure will generate job opportunities, accessibility, improved infrastructure, foreign investment, and, as mentioned, higher living standard of the local community (Ali et al., 2017; Kanwal, Chong, & Pitafi, 2019a; Kanwal, Chong, et al., 2019b). Road and transportation directly benefit the local community, as it generates a new accessibility level, which changes the area's land use pattern and improves the attractiveness of the entire region (Demirel, Sertel, Kaya, & Seker, 2008). This discussion leads us to assume a positive relationship between CPEC road and transportation development and support of tourism in the area. Therefore, we hypothesized that;

**H1c.** There is a positive relationship between CPEC road and transport infrastructure development and community satisfaction.

Local community participation and support in tourism development is important for future development, successful planning, execution, and sustainability of tourism (Jurovski, 1994). Drawing on social exchange theory (SET), past research has demonstrated a positive relationship between perceived positive effects and support for tourism (Ap, 1992; Gursoy et al., 2010; Kang & Lee, 2018; Yoon et al., 2001). SET specifies

that with development, the local community realizes positive effects of tourism and is motivated to contribute, maintain, and support tourism development in the area (Ap, 1992). Látková and Vogt (2012) reported the economic benefits of development for the local community. A general approach is that if local community members benefit from tourism development, their attitudes will be more positive and supportive (Gursoy, Milito, & Nunkoo, 2017). Miyakuni, Fujita, Koshiba, and Rengiil (2018) argued that for tourism development, host communities' perception should be considered during the process. Road and transport infrastructure is important for tourism development in the area, as infrastructure development makes tourist sites more attractive. In addition, the literature shows that tourism development will be vulnerable if the development is designed and constructed without the local community's knowledge and support (Kang, Lee, Yoon, & Long, 2008; Yoon et al., 2001).

Past research has examined factors that may influence local residents' attitudes and support towards tourism development (Látková & Vogt, 2012; McGehee, Andereck, & Vogt, 2002; Park et al., 2015; Yoon et al., 2001). For example, Látková and Vogt (2012) investigated antecedents that influence local residents' support, including the benefits of tourism. Yoon et al. (2001) highlighted local residents' gains from tourism development in terms of economic, environmental, social, and developmental benefits. McGehee et al. (2002) argued that a host community that benefits from tourism may have positive perceptions toward tourism and will support the tourism development process.

Past literature indicates environmental factors affecting local residents' perceptions related to tourism development (Andereck & Vogt, 2000; McGehee & Andereck, 2004). The perceived negative environmental impact of tourism is the destruction of natural beauty, air pollution, and the deterioration of cultural or historic resources (Yoon et al., 2001). Due to several negative impacts of road and transportation on the environment, the local community may perceive some negative effects of infrastructure development. For example, the development of road and transportation changes the agricultural landscape by reducing agricultural land (Kanwal, Chong, et al., 2019b). Additionally, road and transportation creates a safety problem for the local community, as literature indicates the ratio of accidents increases with the development of road and transportation in the region (Kanwal et al., 2019a). The process of road construction consumes a tremendous amount of water, resulting in wastage of clean water in the area (Khwaja, Saeed, & Urooj, 2018). In addition, during road construction, noise generated from drilling and heavy machinery could be a big problem for the host community, which may also impact the environment in the area (Kanwal, Chong, et al., 2019b). Therefore, it is reasonable to understand that, with CPEC road and transportation infrastructure development, the local community may perceive positive benefits as well as negative environmental impacts, which may subsequently lead to their curtailed support for tourism in the area.

Scholars have identified the improvement in a local community's quality of life that results in community satisfaction with tourism development, which is another indicator affecting the supportive behavior of the local community towards tourism development (Ekicia & Cizelb, 2014; Khadaroo & Seetanah, 2007). According to past research, local community satisfaction is important for the success of a development project (Sarigul, 2017). The local community is the main stakeholder of development in the area. Therefore, understanding the factors which influence local residents' satisfaction with regard to tourism development is important for policymakers and for the success of tourism development plans in the area. Recently, research has proposed that the local community satisfaction level is associated with several positive effects on the local community (Jurowski, 1994; Ko & Stewart, 2002; Vargas-Sánchez, Plaza-Mejia, & Porras-Bueno, 2009). Road and transport infrastructure has the ability to improve tourism development and benefit the local community in several regards. For example, Ekicia and Cizelb (2014) conducted a study in Turkey and found that the local community satisfaction level is related to the

positive impact of development. Road and infrastructure development results in several benefits for the local community, including regional development and employment opportunities, which raise their standard of living and thus enhances their satisfaction level (Sirgy, Rahtz, Cicic, & Underwood, 2000). The more the people are satisfied with tourism benefits, the more they will exert their support of tourism development in the area. Our assumptions are consistent with social exchange theory, which implies that a positive exchange process occurs when people perceive positive benefits associated with the exchange. As such, when people perceive positive tourism benefits associated with road and infrastructure development, they are likely to provide their positive support for tourism development in the area. Here, we hypothesized that;

**H2a.** Perceived tourism benefits mediate the relationship between the CPEC road and transport infrastructure development and community support for tourism.

**H2b.** Perceived environmental impact mediates the relationship between the CPEC road and transport infrastructure development and community support for tourism.

**H2c.** Community satisfaction mediates the relationship between the CPEC road and transport infrastructure development and community support for tourism.

### 3. Research methods

#### 3.1. Participants and procedure

The current study was conducted in the Gilgit Baltistan and KPK provinces of Pakistan. There are several reasons for conducting the survey in these areas. For instance, Gilgit Baltistan is the starting point of the CPEC route that connects Khunjerab, at the Pakistan-China border, to the Gwadar port in the Baluchistan province of Pakistan. The Gilgit Baltistan and KPK provinces from where the CPEC road and train networks will pass feature some of the world's most beautiful tourism locations, including the highest mountain range (Hindukush and the Himalayas). Five out of 14 of the world's highest mountains, including K2, the world's second-highest mountain, are in the Gilgit Baltistan province of Pakistan. Some of the world's highest resorts and natural lakes, ancient forts, and many other untouched natural locations in the KPK and Baltistan provinces are likely to attract a high number of tourism activities with the arrival of a significant number of tourists from around the world. Therefore, we chose these areas to conduct our survey and empirically test our theoretical model.

We used a snowball sampling technique, in which we distributed an online survey link to local residents of the KPK and Gilgit Baltistan provinces through our personal contacts. The participants, who represent different professions, including university professors, students, government officers, and workers in different organizations, were asked to provide their response and to pass the survey link to contacts whom they thought would be suitable study participants. The survey was conducted from July 2018 to September 2018. During three months' time, we received 350 questionnaires. Due to specific features of the online survey link, there was no issue of missing information. Out of 350 respondents, 62.9% were male, 65.1% were in the age group of 21–30 years, 62.3% had a master's degree, and 36.3% were in government jobs (see Table 1). The educated population of our survey is a better representative for our study to fulfill our research objectives, as we believe educated people can better understand the environmental and other related impacts of road and transport infrastructure.

#### 3.2. Research instrument

This study's research model consists of five variables: CPEC road and infrastructure development, perceived environmental impact, perceived

**Table 1**  
Demographic information of the samples.

	N	Percentage
<b>Gender</b>		
Male	220	62.9
Female	130	37.1
<b>Age</b>		
21–30 years old	228	65.1
31–40 years old	111	37.7
41–50 years old	11	3.1
<b>Education of Respondents</b>		
Bachelors	79	22.6
Masters	218	62.3
PhD. Degree	53	15.1
<b>Type of Occupation</b>		
Government Job	127	36.3
Private Job	67	19.1
Student	69	19.7
Business Man	56	16.0
House Wife	31	8.90

tourism benefits, local community satisfaction, and community support for tourism. All the scale measures were adapted from previous research. The scale of CPEC road and infrastructure development was taken from past studies by Kim, Jun, Walker, and Drane (2015) and Nazneen et al. (2019). This scale consists of five items in total and was measured in terms of the development of road and infrastructure with regard to CPEC. The dependent variable of community support for tourism consists of five items and was taken from McGehee and Andereck (2004), Yoon et al. (2001), and Jurowski (1994). This scale measures local residents' support towards tourism in the context of CPEC development project. The scale of perceived tourism benefits consists of four items and was taken from Gursoy et al. (2010), Nunkoo and Ramkissoon (2011a), and Rasoolimanesh et al. (2017). The scale of perceived environmental impact consists of four items and was taken from Park et al. (2015) and Yoon et al. (2001). This scale measures perceived negative environmental impact related to road and infrastructure development. The three-item scale of community satisfaction was taken from Park et al. (2015), Ekicia and Cizelb (2014), and Ko and Stewart (2002). This scale measures local residents' satisfaction with the development of CPEC project. All the questions were designed on five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree.

**4. Analyses and results**

**4.1. Common method variance (CMV)**

Research suggests that there are chances of the occurrence of common method variance (CMV) when the data related to independent and dependent variables are collected at the same time and from the same source (Podsakoff, MacKenzie, & Podsakoff, 2012). As CMV can negatively affect the findings of research in social sciences, it is important to address this issue. Scholars have suggested different techniques to assess the issue of CMV in a data set. For example, Harman's single factor test is widely used to assess CMV (Liang, Saraf, Hu, & Xue, 2007; Pitafi, Liu, & Cai, 2018). According to this approach, there is no serious issue of CMV in the data if the first factor does not show a value higher than 50% (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Results of the analysis of our data revealed that the total of five factors were generated with eigenvalues >1, which accounts for 70.26%. The first factor shows only 22.02% value, which is less than the 50% threshold (Podsakoff et al., 2012); therefore, these results confirm the nonexistence of CMV in our data set. Second, we utilized another approach to analyze the possible threat of CMV, as suggested by Liang et al. (2007) and Podsakoff et al. (2012). According to this approach, the first substantive loadings of all the items and their square values are calculated. Next, common method factor is included in the research model, and again we analyze the

method load and squared values of all the items. In the end, comparison of the results of both analyses show that average squared substantive loading is 0.77%, and the average of squared method loading is 0.20%; average squared substantive loading is higher than squared method loading, and method loading values of all the items are insignificant as shown in Table 2. Therefore, low values and insignificant method loading explain that CMV is not a problem in our dataset.

**4.2. Validity and reliability**

The study's proposed research model was analyzed in two steps. We analyzed the measurement model and the structural model. For reliability and validity, confirmatory factor analysis (CFA) was conducted on all the constructs using the maximum likelihood method. Results in Table 3 indicate that loadings of all the items are higher than 0.60, composite reliability (CR) > 0.70, Cronbach's alpha (CA) > 0.70, and average variance extracted (AVE) > 0.50, which are higher than the suggested thresholds (Bagozzi, Yi, & Phillips, 1991; Fornell & Larcker, 1981; Nunnally & Bernstein, 1978). These findings confirm that our proposed research model has internal consistency and good composite reliability and convergent validity.

For discriminant validity, we observed AVE square root values, as shown in Table 4. All values of AVE square root are higher than the inter-correlation of each construct. These results indicate that each variable is different from the other (Joe F Hair, Ringle, & Sarstedt, 2011). Therefore, the measurement model has good discriminant validity and is reliable and meaningful to examine the structural relationships among the variables.

**4.3. Measurement model**

To analyze the model fit, an entire arrangement of the model was made where three different types of model fit criteria were analyzed, including incremental fit, absolute fit, and parsimonious fit, as proposed by Joe F Hair et al. (2011), Joseph F Hair, Black, Babin, Anderson, and Tatham (1998). The results verified that the fit criteria of the measurement model are within suggested values ( $\chi^2 = 342.28$ , D.F. = 179, RMSEA = 0.05, CFI = 0.95, SRMR = 0.05, NFI = 0.91 and IFI = 0.95, GFI = 0.91), as shown in Table 5.

**Table 2**  
Common Method Variance.

Construct	Item	Substantive R1	R1 <sup>2</sup>	Common Method Loading R2	R <sup>2</sup>
Community support for tourism	CST1	0.767	0.588	0.123	0.015
	CST2	0.752	0.565	0.07	0.004
	CST3	0.751	0.564	0.064	0.004
	CST4	0.824	0.678	0.131	0.017
	CST5	0.765	0.585	0.075	0.005
CPEC road and transport infrastructure development	CPEC01	0.745	0.555	0.04	0.001
	CPEC02	0.788	0.620	0.084	0.007
	CPEC03	0.743	0.552	0.076	0.005
	CPEC04	0.678	0.459	0.094	0.008
	CPEC05	0.759	0.576	0.028	0.000
Perceived tourism benefits	PTB01	0.958	0.917	-0.009	0.000
	PTB02	0.610	0.372	0.125	0.015
	PTB03	0.847	0.717	-0.022	0.000
	PTB04	0.821	0.674	-0.012	0.000
Perceived environmental impact	PPEI01	0.865	0.748	0.649	0.421
	PPEI02	0.758	0.574	0.621	0.385
	PPEI03	0.822	0.675	0.621	0.385
	PPEI04	0.772	0.595	0.726	0.527
Perceived community satisfaction	PCS01	0.759	0.576	0.191	0.036
	PCS02	0.744	0.553	0.233	0.054
	PCS03	0.792	0.627	0.084	0.007
	AVG	0.774	0.605	0.200	0.095

**Table 3**  
Results of Confirmatory Factor Analysis.

Construct	Items	Loading	CA	CR	AVE
Perceived environmental impact	4	0.935	0.88	0.89	0.73
		0.690			
		0.897			
Perceived community satisfaction	3	0.922	0.80	0.88	0.71
		0.817			
		0.835			
Perceived tourism benefits	4	0.882	0.87	0.92	0.73
		0.817			
		0.872			
CPEC road and transport infrastructure development	5	0.767	0.85	0.90	0.52
		0.785			
		0.863			
Community support for tourism	5	0.828	0.88	0.91	0.68
		0.833			
		0.844			
		0.833			
		0.839			
		0.794			
		0.808			
		0.846			
		0.818			

Note: CA = Cronbach's alpha; CR = composite reliability; AVE = average variance extracted.

4.4. Structural model

The objective of the current study is to examine the relationship between the CPEC road and transport infrastructure development in Pakistan, perceived tourism benefits associated with this development, perceived environmental impact, community satisfaction, and community support for tourism in the country. SEM with maximum likelihood was performed as recommended by Hair Jr, Babin, and Krey (2017). The findings show that the fit of the structural model is acceptable, as the results are within the prescribed thresholds ( $\chi^2 = 594.60$ , D.F. = 269, RMSEA = 0.05, CFI = 0.91, SRMR = 0.05, NFI = 0.86 and IFI = 0.92, GFI = 0.91), as shown in Table 5.

4.5. Hypotheses testing

To test the proposed hypotheses of the study, the standardized coefficient values, t-values, and p-values were analyzed using AMOS 21.0. Table 6 indicates the results of our proposed hypotheses. The impact of CPEC road and transport infrastructure development shows a significant positive relationship with perceived tourism benefits ( $\beta = 0.151$ ,  $t = 2.305$ ,  $p < 0.05$ ), validating our H1a. Results rejected H1b that the perceived impact of CPEC road and transport infrastructure

**Table 4**  
Means, Standard Deviation, and Correlations.

Variable	M	SD	1	2	3	4	5
1. Perceived environmental impact	3.38	1.16	<b>0.85</b>				
2. Perceived community satisfaction	4.17	0.89	0.06	<b>0.84</b>			
3. Perceived tourism benefit	4.09	0.84	0.03	0.16**	<b>0.85</b>		
4. CPEC transport and infrastructure development	4.27	0.75	0.03	0.24**	0.12**	<b>0.70</b>	
5. Community support for tourism	4.04	0.67	0.08	0.19**	0.17**	0.07	<b>0.82</b>

Note: \* $p < 0.05$ , \*\* $p < 0.001$ , figures in bold are values of square root of AVE.

**Table 5**  
Comparison measure model and structural model.

Model	Absolute fit measures	SRMR	RMSEA	Incremental fit measures	PNFI	Parsimonious fit measures	IFI	TLI
	$\chi^2/DF$			NFI		CFI		
MM	1.91	0.05	0.05	0.91	0.89	0.95	0.95	0.95
SEM	2.21	0.05	0.05	0.86	0.86	0.91	0.92	0.91

development has an insignificant relationship with perceived environmental impact ( $\beta = -0.031$ ,  $t = 0.299$ ,  $p > 0.05$ ). The impact of CPEC road and transport infrastructure development revealed a positive relationship with community satisfaction ( $\beta = 0.339$ ,  $t = 4.524$ ,  $p < 0.001$ ), which validated our H1c. Additionally, for testing mediation effects, we initially analyzed the effect of perceived environmental impact, community satisfaction, and tourism benefits on support of tourism. The findings show that perceived environmental impact is insignificantly related to support for tourism ( $\beta = 0.030$ ,  $t = 1.253$ ,  $p > 0.05$ ), and community satisfaction ( $\beta = 0.150$ ,  $t = 3.275$ ,  $p < 0.001$ ) has a positive relationship with support for tourism in the context of CPEC. Perceived tourism benefit also has a significant relationship with support for tourism ( $\beta = 0.143$ ,  $t = 2.849$ ,  $p < 0.001$ ), as shown in Fig. 2. However, findings indicate that all the control variables have an insignificant relationship with our dependent variable, support for tourism.

For mediating effects, we used the bootstrapping method, with 5000 bootstrapped samples as suggested by Hayes (2013). According to this approach, if the lower confidence intervals (LLCI) and upper confidence intervals (ULCI) do not contain zero, the mediation is considered significant. The findings reported in Table 7 show that perceived tourism benefit mediates the relationship between perceived impact of CPEC road and transport infrastructure development and community support for tourism (LLCI: 0.0014, ULCI: 0.0654); therefore, H2a is supported. Results also reveal that local community satisfaction mediated the

**Table 6**  
Path Analysis.

Path	Standard Coefficient	t-value	Result
CPEC transport and infrastructure development to perceived tourism benefits	0.151*	2.305	Supported
CPEC transport and infrastructure development to perceived environmental impact	-0.031	0.299	Not-Supported
CPEC transport and infrastructure development to perceived community satisfaction	0.339**	4.524	Supported
Perceived environmental impact to community support for tourism	0.030	1.253	Not-Supported
Perceived community satisfaction to community support for tourism	0.150**	3.275	Supported
Perceived tourism benefit to community support for tourism	0.143*	2.849	Supported
Occupation	-0.022	-0.370	Insignificant
Education Level	-0.076	-1.336	Insignificant
Age	0.058	0.927	Insignificant
Gender	0.023	0.317	Insignificant

Note: \* $p < 0.05$ , \*\* $p < 0.001$ .

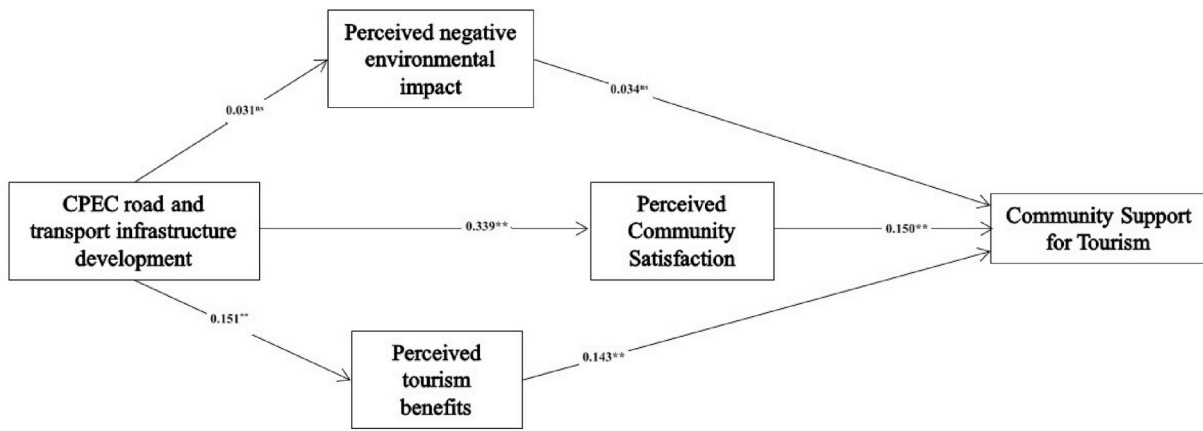


Fig. 2. Structural Equation Modeling, Note: \*p < 0.05, \*\*p < 0.001, ns = non-significant.

Table 7  
Results of the bootstrapping method for mediation.

IV	M	DV	Effect of IV on M (a)	Effect of M on DV (b)	Direct effect (c')	Indirect effect (a*b)	Total effects (c)	95% CI	Result	
H2a	CPEC	PTB	CST	0.141*	0.130*	0.044*	0.019*	0.063*	(0.0014, 0.0654)	Supported
H2c	CPEC	PCS	CST	0.295**	0.142*	0.021*	0.042**	0.063*	(0.0144, 0.0863)	-

IV = CPEC transport infrastructure development, PTB= Perceived Tourism Benefits, CS = Perceived Community Satisfaction. CST = Community support for Tourism. Note: \*p < 0.05, \*\*p < 0.001.

relationship between the perceived impact of CPEC road and transport infrastructure development and community support for tourism (LLCI: 0.0144, ULCI: 0.0863), thereby supporting H2c. As we reported earlier, perceived CPEC road and transport infrastructure development has shown an insignificant relationship with perceived environmental impact, and perceived environmental impact is also not significantly associated with community support for tourism; therefore, these results reject our hypothesis H2b for the mediating role of perceived environmental impact on the relationship between CPEC road and transport infrastructure development and community support for tourism.

## 5. Discussion, implications, and limitations

### 5.1. Discussion

The purpose of this research is to investigate the impact of CPEC road and transportation infrastructure development on support for tourism in Pakistan. Pakistan’s northern areas, including the KPK and Gilgit Baltistan provinces, are full of natural beauty with the world’s highest mountains, lakes, and glaciers. Due to poor road and transportation infrastructure development, tourism activities have been limited in these areas in past. With the development of CPEC, a multi-billion dollar road and transportation infrastructure development project, researchers expect a boom in tourism activities in these areas in near future (Ali et al., 2017; Kanwal, Chong, et al., 2019b; Kanwal, Pitafi, Rasheed, et al., 2019; Wolf, 2018). Drawing on social exchange theory, we investigated the relationship between CPEC road and transport infrastructure development and community support of tourism. Perceived tourism benefits, community satisfaction, and perceived positive environmental impact are proposed as the underlying mediating variables in the relationship between CPEC road and transport infrastructure development and community support for tourism.

Results of the study confirm that CPEC road and transport infrastructure development is positively related to community support for tourism and tourism benefits in Pakistan, and community satisfaction plays the mediating role in this relationship. However, perceived environmental impact has not been found as a significant mediator in this

study. We can explain our results on the basis of social exchange theory (Emerson, 1976), which implies that people exert their support for tourism as they perceive personal benefits as a result of the exchange process. Our results are consistent with previous studies in the tourism field, which suggest that tourism activities highly depend on the transportation infrastructure of the region (Kurihara & Wu, 2016; Li et al., 2019; Virkar & Mallya, 2018). For example, Li et al. (2019) investigated the impact of a high-speed train on tourism activities in China and found that with high-speed train services, tourism activities have significantly improved in China.

Recent research has suggested that community satisfaction is an important predictor of community support for tourism (Nunkoo & Ramkissoon, 2011b; Park et al., 2015). Ko and Stewart (2002) argued that community satisfaction is an important predictor for understanding community perceptions associated with tourism development. Our rejected hypothesis regarding environmental impact can be explained in several ways. For instance, the CPEC project is in its initial stage; the construction has just started, so the negative impact on the environment at this stage might not be significant enough to influence community perceptions. Moreover, the large-scale publicity in local and international media on the positive effects of CPEC may nullify any negative perceptions related to this project. For instance, the media has reported several positive benefits of CPEC road and transportation infrastructure development for the local community, including the boost to the local economy, business activities, and more employment, education, and health facilities. Media and government have also highlighted some positive environmental impacts of CPEC in terms of improved quality of life, construction of modern national parks, preservation of wildlife with modern approaches, development of natural scenery with modern facilities, and others (Kanwal, Pitafi, Rasheed, et al., 2019). It is possible that, due to these positive perceptions in the minds of people, the negative environmental impact is not very significant. Additionally, tourism development is a relatively clean industry as compared to other manufacturing industries; this clean development can thus have a positive impact on the local community.

## 5.2. Theoretical and practical implications

The current study makes a substantial contribution in tourism literature, as it sheds light on local residents' attitudes toward tourism development in Pakistan in the context of CPEC road and transport infrastructure development. For instance, the relationship found between CPEC road and transport infrastructure development and community support for tourism in Pakistan is an important finding in the context of social exchange theory; it helps us to better understand the role of road and transport infrastructure development as an important predictor of community support of tourism development. Recent studies, for instance, Kanwal, Pitafi, Rasheed, et al. (2019) have found road and transportation as predictors of community support of development projects in the region. We extend this line of research by examining road and transportation development as a determinant of community support for tourism in the country. We, therefore, add to the tourism literature by investigating this important predictor of community support for tourism. In addition to investigating a link between road and transport development and community support of tourism, our study answers the question of how road and transport infrastructure development is related to community support of tourism in a country. We explain three mechanisms in this relationship: (i) perceived tourism benefits, (ii) perceived environmental impact, and (iii) community satisfaction. Although we did not find a significant role of perceived environmental impact, the significant mediating role of perceived tourism benefits and community satisfaction explains the relationship between roads and transport infrastructure development and community support for tourism in the area. It explains that roads and transport infrastructure development enhances perceived tourism benefits in the minds of the local community as well local community satisfaction with tourism activities, which further lead to their positive support for tourism.

Our findings have several practical implications for government officials, policymakers, and other stakeholders. For example, CPEC originally is not a tourism development project; its main objective is to connect the Peoples' Republic of China to Gwadar port in Pakistan for the purpose of trade. China is investing billions of dollars in road and transport infrastructure development as well as many other projects, including the installation of power plants, development of industrial zones, and more in Pakistan under the umbrella of CPEC. Our study has found a positive relationship between CPEC road and transport infrastructure and community support for tourism in Pakistan. The governments of both countries and CPEC officials can, therefore, think of including tourism development in the CPEC project. Our study has found that community support in the KPK and Gilgit Baltistan provinces is available for tourism development in the areas. Officials of CPEC can, therefore, utilize this community support for developing various tourism sites in these areas. These areas are already blessed with beautiful scenery; the development of tourism sites will, therefore, attract tourists from around the world. Such enhanced tourism activities will thus result in economic and social benefits in the region.

## 5.3. Limitations and future research directions

Despite several implications, our study has limitations that can be addressed in the future. For example, the generalizability of the results may be limited due to the fact that the respondents in this study belong to a specific area; future research can, therefore, be conducted with a larger scope. While the participants in our survey are highly educated, we believe that a highly educated population addressed the main objective of our study, and future research can be conducted involving less-educated individuals and more people from rural areas around CPEC. Third, CPEC belongs to China and Pakistan and is a part of China's "One Belt, One Road" initiative. Our study was conducted in Pakistan, but we believe our research model is related to China as well. Future research can be conducted involving Chinese respondents to investigate

the support of the Chinese community towards tourism development as a result of CPEC roads and infrastructure. Further, as our research model is exploratory in nature, a research study utilizing qualitative research methodology, wherein interviews of residents and government officials are conducted, merits future consideration. In addition, our study explains the underlying mechanisms of how road and transport infrastructure development is related to community support for tourism development; developing and testing a boundary condition on this relationship may also be a future research agenda.

## 6. Conclusion

The results of the present study shed light on the perceptions of local Pakistani residents related to tourism as a result of CPEC road and transport infrastructure development. The survey has shown that the local community has positive perceptions and is ready to provide support for tourism in Pakistan in the context of CPEC. In addition, this study explains the mediating mechanisms in the form of community satisfaction and perceived tourism benefits in the relationship between CPEC road and transport infrastructure and community support for tourism development, which helps us to better understand this relationship. Overall, this study carries important theoretical implications for tourism scholars and provides guidelines for government officials and policymakers. More importantly, this study has explored tourism as an area of investment through the multi-billion dollar megaproject, CPEC.

## Author contribution

**Shamsa Kanwal** is a first author of this manuscript. She conceived the initial idea, conducted the literature review, and proposed research design. **Muhammad Imran Rasheed**, Muhammad Imran Rasheed helped to finalize the research model and design for this study. He edited the initial draft and has particularly written the introduction and discussion sections. **Abdul Hameed Pitafi**, Abdul Hameed Pitafi is the corresponding author, he reviewed the final draft and contributed in analyses of data and interpretation of results. **Adnan Pitafi**, Adnan Pitafi helped in data collection and finalizing research methodology. He particularly contributed in analyses. **Minglun Ren**, Professor Minglun Ren provided the guidance in overall project. He helped in questionnaire design, finalizing research method, and writing the manuscript.

## Declaration of competing interest

No potential conflict of interest was reported by the authors.

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**Shamsa Kanwal** received Master degree in management science specialization (Public Administration) from University of Science and Technology, Hefei, China. She has received a Bachelor of Science (Math), degree from Sindh University, Jamshoro, Pakistan. Her research interests include tourism and society, social media, social networking, and policy issues in developing countries. She has published her findings in journals such as *Technology in Society*, *The Social Science Journal*, and *Technology Analysis & Strategic Management*.



**Dr. Muhammad Imran Rasheed** is a Ph.D at School of Management, University of Science and Technology of China. Dr. Rasheed has published his research in several journals including waste management, personnel review, Ethics and behavior, and information systems management. His current focus of research is in the field of tourism and hospitality, organizational behavior, and information systems and employees.



**Dr. Abdul Hameed Pitafi** is currently doing post doctorate in Hefei University of Technology China. He got Ph.D degree specialization in Information System from the University of Science and Technology of China. He completed his Bachelor of Engineering (Computer System) from Quaid-Awam University of Science and Technology Nawabshah. He received his Master of Science degree in Networks and Telecommunication from Mohammed Ali Jinnah University Karachi. He has more than 15 years of teaching experience. His current focus of research is in tourism and society, information technology and people, and information systems and employees. He has published over 20 publications in SSCI and peer-reviewed journals.



**Adnan Pitafi:** Dr. Adnan Pitafi, is working as an Assistant Professor of Entrepreneurship, at the Mehran University Institute of Science, Technology and Development (MUISTD). He has a doctoral degree from the University of Science and Technology of China (USTC) in Management Sciences and his research focus is Innovation and Entrepreneurship, Technopreneurship, Social Media, and Technology Adoption Models.



**Minglun Ren** is a director and Professor of school of management, at the Hefei University of Technology China. He has published several research papers in national and international research Journals. Professor Minglun Ren was selected into the new century Excellent Talent Support Program of the Ministry of Education in 2011.