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Unpacking the Paradox: Exploring the Knowledge-Attitude-Perception (KAP) and Trust of the Local Community Towards CPEC

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Abstract: This study explores the factors influencing community engagement and their impact on the perceived benefits and negative consequences of the China-Pakistan Economic Corridor (CPEC) among residents of Pakistan's Balochistan and Gilgit-Baltistan (GB) provinces. Based on the stakeholder theory, the study examines the Knowledge-Attitude-Perception (KAP) model of CPEC and the trust of the local people in the CPEC authorities. The research used a survey method, receiving responses from 232 participants. Data analysis was done using PLS-SEM. The analysis indicates that the level of CE influences the perceived benefits and negative impacts of CPEC. This study finds that the level of CE among residents is positively and significantly related to the attitudes and knowledge of residents about CPEC. However, residents' perceptions of CPEC and trust in its authorities have a significant but weak relationship with CE. The research also indicates that through mediation, CE has a significant favorable influence on perceived benefits but a negative influence on the perceived negative impact of development on residents. On the other hand, CE has a positive but marginal effect on the residents' perceived benefits and trust in authorities and a negative yet marginal on the residents' perceived negative impacts.

Key Words: Community Engagement, CPEC, Perceived Benefits, Perceived Negative Impacts, Stakeholder Theory

Introduction

Overview

The human and artificial integrated appraisal reveals that the KAP model helps portray how knowledge, attitudes, and perceptions about large-scale projects have been shaped within the existing knowledge (Cheema & Akbar, 2023). In this model, understanding a project influences people's awareness and subsequent behavior (Ahmad et al., 2023). Likewise, the KAP model regarding the China-Pakistan Economic Corridor (CPEC) looks brighter on some aspects of community participation. CPEC is a large-scale structural development project that seeks to transform China-Pakistan relations by creating infrastructure, income-earning capacities, and connectivity (Muhammad et al., 2023). It holds gigantic stakes in road transport, rail, and power infrastructures. Knowledge about the local communities' perception of CPEC, positive or negative attitudes toward the project, and overall perception of the project's effects might help determine the project's efficiency for the community's support (Shaheen et al., 2023).

Additionally, applying the KAP model in the two regions of Pakistan, Balochistan and Gilgit-Baltistan (GB), it is possible to identify differences in the approach to CPEC. Thus, perception is a historical and socio-economic destiny in Balochistan; therefore, how the residents view the project is a product of this destiny (Jaleel et al., 2023). Likewise, feelings on the part of the region for the CPEC depend upon the community's perceived requirements in GB, coupled with cultural peculiarity prevalent in the specific region (Hussain et al., 2023). Knowledge of these particular regional characteristics through the KAP model

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is significant for enhancing the projects' performance and managing concerns depending on the area (Ali, 2023b).

Problem Statement

A major pragmatic issue identified in this study is that there might be a certain degree of perceived community engagement in Pakistan depending on their KAP towards CPEC (Hussain et al., 2023). According to the research findings, Balochistan people have little or no information about the advantages of CPEC; consequently, they do not trust the Project. It further results in a poor attitude towards the project, slowing local support and cooperation (Ali, 2023b). Moreover, resource distribution and past formations worsen this (Abb, 2023). The awareness of the CPEC projects is somewhat impressive in GB; however, the negative feelings about the project's consequence on culture and economy develop distrust among the people toward the related authorities of the project (Ali, 2023a).

This disconnection impacts the reception of the dividends and possible losses that the residents in the CPEC region stood to gain or lose, respectively (Hussain et al., 2023). Concerning the project details, the lack of congruence between local considerations and project objectives is indicative of the imperative need for better communication, effective reporting, and active involvement of the community in the decision-making process at the local level to ensure that the local expectations are well-aligned with the provisions of CPEC and that the benefits arising out of CPEC's framework have been fairly and equitably distributed amongst all the stakeholders involved (Ali, 2023b).

Research Gap

Despite the critical gaps in research on CPEC's local impact in Balochistan, GB highlighted the need for a comprehensive study (Jaleel et al., 2023). Firstly, previous studies on the CPEC were framed mainly at the national level, with less emphasis on regional dynamics and effects on such regions as Balochistan and GB. These regions' socio-economic and cultural characteristics, which are vital for CPEC's implementation, have not been in-depth in the literature (Ali, 2023a). Few studies, therefore, shed light on the role that geographic distribution of CPEC benefits plays in shaping perception and participation in different regions, thus calling for more detailed and regional investigations on the role played by CPEC in different parts of the region (Abb, 2023).

Similarly, existing research has overlooked the social, political, and historical factors that influence the local perception of CPEC. Baluchistan and GB people's views and participation regarding the project are based on their historical demerits and culturally influenced preferences (Jaleel et al., 2023). Comparatively, most CPEC research focused on economic impacts without applying the KAP model to analyze community concerns. Theoretical frameworks addressing the relationship between KAP, trust, and perceived benefits and risks are underutilized. This gap fails to comprehensively analyze local communities' engagement and the impact of CPEC developments (Aslam et al., 2023).

Previous research has employed mainly cross-sectional qualitative research that is informative but non-generalizable. An approach can give statistical data on attitudes and perceptions from samples than the qualitative approach, thus testing another factor such as trust in authorities and perceived benefits (Feng et al., 2023). This method is beneficial because it corroborates minor effects and provides a different perspective on regional variability for better policy advances (Ali, 2023b). Hence, the study has focused on *how the knowledge, attitude, perception (KAP) towards CPEC, and trust in CPEC authorities influence community engagement and subsequently affect the perceived benefits and negative impacts of CPEC among the residents of Balochistan and Gilgit-Baltistan (GB) provinces?*

Literature Review

Stakeholder Theory

Stakeholder theory stresses that organizations and projects involve several stakeholders, including employees, customers, suppliers, the surrounding community, and governments, and their expectations must be addressed to attain sustainable business success (Parmar et al., 2010). The fundamental concept



is that managing stakeholder interests can produce better and more equitable results for all (Freeman et al., 2020).

Further, when implementing CPEC projects, stakeholder theory helps understand how diverse stakeholders have embraced or responded to it, especially using the KAP framework (Shah & Kausar, 2021). Similarly, existing theory, when tailored with the KAP model, will help the researcher establish the degree to which knowledge, attitude, and perception of the stakeholders are met by CPEC. It helps to assess the following points: how the project results correspond with local practices, the project stakeholders, and how the project interacts with them (Waheed & Zhang, 2022). It also revealed how these factors affect community support and communal structure trust. Therefore, stakeholder theory, accommodation with the KAP model, offered a solid foundation to improve CPEC's efficiency by overhauling the multifaceted requirements of its stakeholders (Mahajan et al., 2023).

Development of the Hypotheses

Outcomes of Community Engagement: Ahmad et al. (2023) stated that community engagement strongly influences the perceived benefits and negative implications of the CPEC. Similarly, community engagement entails using residents in decision-making and receiving their opinions about the project, which alters their understanding of the project (Feng et al., 2023).

Additionally, in the framework of stakeholder theory, it is possible to affect people's attitudes and perceptions, for instance, of the local communities, which are the stakeholders. Engagement commonly improves the perceived advantage of a project by bringing its goal in line with expectations in the local community and eliciting positive attitudes and support (Shahzad & Sunawar, 2023). On the other hand, passive engagement reinstated new concerns about the adverse effects, stating that the project brought some effects that did not go well with the people (Ali et al., 2024).

Thus, community engagement is essential for projects such as CPEC, under which the project impacts multiple regions and stakeholder groups. Engagement with the locals ensures that proper acoustics are made and that most negative perceptions are countered, leading to the maximum benefit reaping and proper and efficient project implementation (Ahmad et al., 2023). Thus, the hypothesis has formed:

H1. Community engagement significantly affects (a) the perceived benefits of CPEC and (b) the perceived negative impacts of CPEC.

Residents' Perception Towards CPEC: Community engagement is affected by residents' perception of the CPEC. In this case, community engagement entails promoting community participation in matters relating to the project they participate in, proposing feedback from the residents, providing general feedback, and communicating with them. It also includes how effectively local perceptions and issues have been incorporated into the planning and implementation of the project (Aziz et al., 2023a).

Theoretically, residents' perception of a place and their level of participation supports the stakeholder theory that posits that due to their status as stakeholders, residents' attitudes and perception will affect their participation in the community (Ahmad et al., 2023). Thus, any optimistic perception residents have towards CPEC will entail proactive participation, which will improve collaboration and support. On the other hand, negative perceptions of change may predispose the change process and the champion to low levels of engagement and high levels of resistance (Ali et al., 2024).

Additionally, the analysis showed that community engagement mediates the relationship between the community and their engagement in the positives and negatives of CPEC. Community engagement can help enhance perceived benefits by familiarizing people with the project and its necessity, increasing its support (Hafeez, 2023). Conversely, if the engagement level is low, there can be aggravation of the negative perceptions an organization may hold towards specific effects, thus increasing the level of concern. Therefore, the engagement of the community in this process is central to the appraisal of residents' perception of the intended impact of CPEC and is a key to attaining positive project results (Aziz et al., 2023a). Thus, the hypotheses have formed:

H2. Residents' perception of CPEC has a significant effect on community engagement.

H3. Community engagement significantly mediates residents' perceptions of CPEC's (a) benefits and (b) negative impacts.

Residents' Knowledge of CPEC: In this regard, knowledge is vital and reflects the residents' ability to understand the aims of CPEC, projects, and the probable effects. Likewise, community engagement refers to how socially included the residents are in discussions and planning for the project (Aziz et al., 2023a). Additionally, the existing theory exists to support that residents' knowledge level influences the community's engagement, and in this context, the residents shall be engaged constructively in the project. Increased understanding minimizes non-engagement and improves residents' engagement efficiency based on the assessment. On the other hand, lack of knowledge tends to slow the active engagement and even the level of support towards the project (Muhammad et al., 2023).

Thus, community engagement partially mediates the relationship between residents' awareness and perception of CPEC's benefits and costs. In this case, the residents will be knowledgeable and active, giving a positive view of CPEC and its objectives (Ali et al., 2024). Moreover, insufficient knowledge of a project and its potential benefits and compensations can lead to a lack of active engagement and, consequently, to increased fears of negative consequences on the part of the residents (Zulfaqar et al., 2023). Therefore, community engagement can be critical in translating residents' knowledge into positive perceptions and mitigating any adverse effects of CPEC (Ali et al., 2024). Thus, the hypotheses have formed:

H4. Residents' knowledge of CPEC has a significant effect on community engagement.

H5. Community engagement significantly mediates the effect of residents' knowledge of CPEC on (a) the perceived benefits of CPEC and (b) the perceived negative impacts of CPEC.

Residents' Attitude towards CPEC: According to research, attitude can be defined as residents' overall assessment and emotional response toward CPEC, with possible responses being positive, none (neutral), or negative (Aziz et al., 2023a). A positive attitude expectantly leads to a high level of participation due to residents willing to be part of the project. Therefore, having a negative attitude means less engagement and possibly outright opposition (Ali et al., 2024).

Moreover, the logical reason for the existence of this relationship comes from stakeholder theory, which states that the attitude is reflected in the level of engagement. In this context, it can be stated that positive attitudes, in most cases, result in active engagement, which, in turn, contributes to strengthening cooperation and support (Ahmad et al., 2023). However, poor attitudes may lead to the withdrawal of residents' energy and interest, leading to other concerns and problems concerning the project (Cheung et al., 2023).

Furthermore, community engagement was a mediator, and adjustment of residents' attitudes influenced their perception of the positive and negative aspects of CPEC. However, when the residents have a positive attitude toward the respective project, they can invest their time and participation in understanding the benefits of CPEC, improving their perception of the project (Rasool et al., 2023). However, if the residents' attitude is negative and their engagement is low, the adverse effects perceived may be exacerbated by the display of more problems and lack of information exchange. Therefore, community awareness and involvement are essential in determining how residents' attitude affects the overall perception of CPEC (Aziz et al., 2023a). Thus, the hypotheses have formed:

H6. Residents' attitude towards CPEC has a significant effect on community engagement.

H7. Community engagement significantly mediates the effect of residents' attitudes towards CPEC on (a) the perceived benefits of CPEC and (b) the perceived negative impacts of CPEC.

Residents Trust in CPEC Authorities: Positive attitudes only toward CPEC authorities substantially influence the community engagement of residents. According to a study, trust means the level of confidence residents have in the probability of the ultimate trustworthiness, ability, and motives of authorities belonging to CPEC (Aziz et al., 2023a). If the levels of trust are high, the residents are also likely



to be more active and supportive of the community and the project since they are confident in the authorities' dedication and credibility. However, trust can also be low, which means that project engagement is reduced, and residents are highly skeptical (Zulfaqar et al., 2023).

This aligns with stakeholder theory, which affirms that stakeholders' trust in the project authorities influences their engagement. Trust opens communication and coordination within the framework of communities' functioning, thereby improving workflow efficiency. Residents' engagement with CPEC authorities ensures they remain engaged, enhancing the likelihood of the project addressing their requirements and expectations (Ahmad et al., 2023).

Also, community engagement played a role in mediating the relationship between the level of trust the residents have regarding CPEC and their perceptions of the benefits and costs of the project. High trust enhances active engagement, yielding more favorable perceptions of the CPEC's benefits and the sponsor organization's responsiveness to residents' needs and concerns (Cheung et al., 2023). Low trust and engagement mean that those adverse effects would be magnified, given that there is no progress in dealing with issues and little communication. Therefore, due to improper understanding and misunderstanding from a lack of perceived trust, community engagement is critical in defining residents' perceptions of CPEC (Aziz et al., 2023a). Thus, the hypotheses have formed:

H8. Residents' trust in CPEC authorities has a significant effect on community engagement.

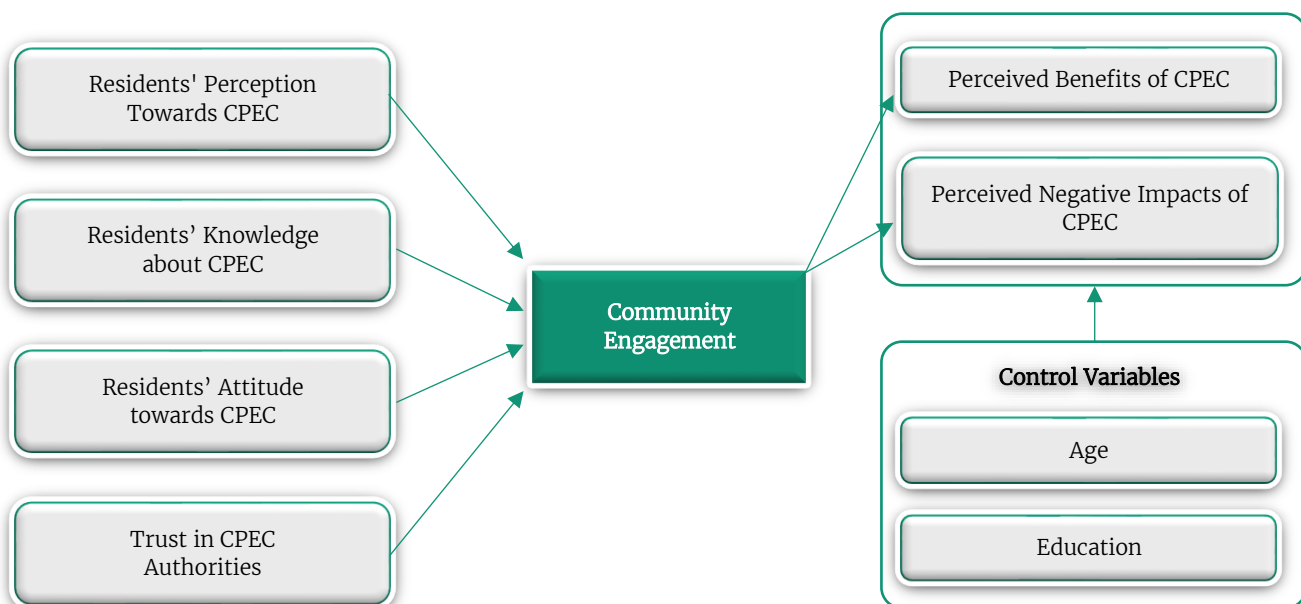
H9. Community engagement significantly mediates the effect of residents' trust in CPEC authorities on (a) the perceived benefits of CPEC and (b) the perceived negative impacts of CPEC.

Control Variables: Research has shown that age and education influence perceived project benefits and negative consequences. Education levels have influenced how people perceive and evaluate the performance of the projects, and people with higher education are likely to be more critical while evaluating the performance of the projects (Hafeez et al., 2024). It is always essential to isolate such variables to improve analysis and ensure that opinions differ from one organization to another. Some of these factors have been used in recent studies as a control variable to gain more objective and balanced findings on project effects. For example, Zulfaqar et al. (2023) have excluded a confounding effect of these variables from getting more relevant information about how different demographics receive project effects.

Research Framework

Figure 1

Research framework



Methodology

Sample and Population

The target sample population involves people residing in Balochistan province and the GB area, given that they would help present a wide-lens view of how the CPEC has impacted them. As the largest province with a population of nearly 13 million people, the study requires geographical sample heterogeneity encompassing provincial cities like Quetta and Gwadar and rural areas to represent Balochistan's socio-economic demography (Statistics, 2023). Similarly, the total population of the GB area is about 1.8 million. The sample should include people from different regional districts, like Gilgit, Skardu, and Hunza, due to the geographical and cultural diversities of the area. Table 1 shows the demographic profile of the respondents.

Table 1

Demographic profile (n = 232)

		Frequency	Percent
Province	Balochistan	121	52.2
	Gilgit-Baltistan	111	47.8
Age	18-24	44	19.0
	25-34	50	21.6
	35-44	42	18.1
	45-54	49	21.1
	55 or above	47	20.3
Gender	Male	122	52.6
	Female	110	47.4
Education Level	Primary or below	53	22.8
	Secondary	58	25.0
	Tertiary (College/University)	62	26.7
	Postgraduate	59	25.4
Occupation	Student	41	17.7
	Government employee	34	14.7
	Private sector employee	48	20.7
	Businessperson	32	13.8
	Farmer/Herder	41	17.7
	Other	36	15.5
Have you participated in any CPEC-related activities (e.g., public consultations, protests)?	Yes	191	82.3
	No	41	17.7
How do you usually get information about CPEC?	Social media	32	13.8
	Local news	43	18.5
	Government officials	39	16.8
	Community leaders	62	26.7
	Other	56	24.1

Measures

The original instruments from the medical paper (Sadeeqa et al., 2013) were designed to assess specific health-related behaviors, conditions, perceptions, knowledge, and attitudes in a clinical context. These instruments of perception and knowledge are being adopted and transformed into the study's context.



Each variable is measured using a specific number of 5-point Likert scale questionnaire items. Resident's perception towards CPEC has six items adapted from (Sadeeqa et al., 2013), such as: "Residents have the right to know about the environmental and social impact of CPEC projects in their area." The resident's knowledge about CPEC has five items, and they are adapted from Ali and Qazi (2020) and Sadeeqa et al. (2013). An example is: "I have heard about CPEC." Resident's attitude towards CPEC has five items, based on Saad et al. (2019), such as: "CPEC will improve the quality of life." Trust in CPEC authorities also has five items, sourced from Sadeeqa et al. (2013), such as: "I trust that CPEC authorities will prioritize the economic benefits of local communities in their project decision." Community engagement has four items, and they were adapted from Kumar and Kumar (2020) and Sadeeqa et al. (2013), such as: "This community continuously tries to improve its ties with its members." Perceived benefits of CPEC have four items, adapted from Kanwal et al. (2020), such as: "CPEC will make the economy strong." The perceived negative impact of CPEC also has four items, adapted from Ali et al. (2018), such as: "CPEC will increase the crime rate."

Data Collection

The study adopted a survey method to assess the KAP model regarding CPEC and trust in CPEC authorities. This systematic method helps obtain measurable data from a large, cross-sectional population (Ahmad et al., 2023). Surveys are helpful as a quantitative tool in getting a cross-sectional perspective of the people's opinions, perceptions, and level of knowledge regarding their respective communities in Balochistan and GB. This method enables the assessment of variables that are difficult to define, like trust, effects on perceived benefits, and negative consequences of CPEC (Malokani, 2023). Moreover, the structured questionnaires ensure that the responses are uniform and allow for group comparison. Surveys also allow for a convenient collection of data from various regions, which is essential for analyzing regional differences in people's attitudes and perceptions about the effect of CPEC (Iftikhar et al., 2024).

Data Analysis

This research employed Partial Least Squares Structural Equation Modeling (PLS-SEM) for data analysis because of its suitability in handling multiple formative constructs and their relationships (Hair et al., 2016). Additionally, PLS-SEM is highly relevant for testing the KAP model because the estimation of the direct and mediated effect of other variables, including residents' degree of knowledge, attitude, and trust in the CPEC authorities, on engagement and perceived effects are addressed by PLS-SEM (Hair et al., 2011). In addition, it is suitable for this kind of research as it enables the investigation of both the reflective and the formative constructs. The capacity of PLS-SEM to handle smaller samples and non-normal distribution is significant since the population of Balochistan and GB is quite diverse (Hair et al., 2016). Furthermore, through the lens of PLS-SEM, researchers appreciate the measurement and the structural models as a combined strategy of archetypes, providing valuable suggestions for policy recommendations that are constructive to the communities and impact perceptions based on the roles of KAP factors (Hair et al., 2019).

Results and Discussions

Measurement Model

A measurement model outlines how variables representing theory-derived concepts are operationalized and linked to observed variables (Leitgöb et al., 2023). Table 2 shows the results of indicator reliability, the internal consistency of the constructs, and the degree of convergence between indicators and constructs.

Table 2

Measurement model

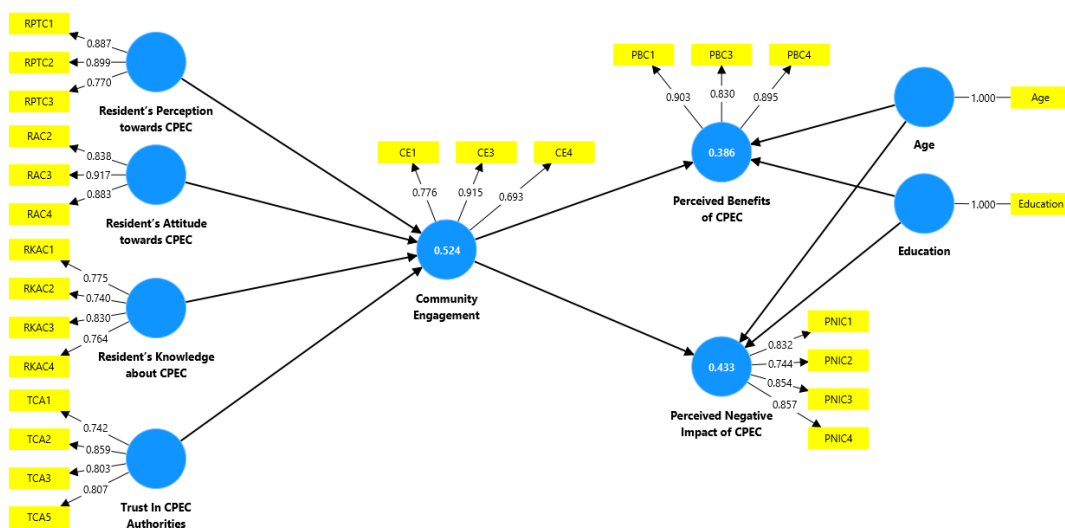
	Loadings	Prob.	VIF	Alpha	CR	AVE
CE1 <- CE	0.776	0.000	1.786			
CE3 <- CE	0.915	0.000	2.363	0.709	0.840	0.640
CE4 <- CE	0.693	0.000	1.444			

	Loadings	Prob.	VIF	Alpha	CR	AVE
PBC1 <- PBC	0.903	0.000	2.289			
PBC3 <- PBC	0.830	0.000	1.954	0.851	0.909	0.768
PBC4 <- PBC	0.895	0.000	2.088			
PNIC1 <- PNIC	0.832	0.000	1.951			
PNIC2 <- PNIC	0.744	0.000	1.486	0.840	0.893	0.678
PNIC3 <- PNIC	0.854	0.000	2.444			
PNIC4 <- PNIC	0.857	0.000	2.494			
RAC2 <- RAC	0.838	0.000	1.922			
RAC3 <- RAC	0.917	0.000	2.722	0.854	0.911	0.774
RAC4 <- RAC	0.883	0.000	2.169			
RKAC1 <- RKAC	0.775	0.000	1.846			
RKAC2 <- RKAC	0.740	0.000	1.765	0.798	0.859	0.605
RKAC3 <- RKAC	0.830	0.000	1.387			
RKAC4 <- RKAC	0.764	0.000	1.779			
RPTC1 <- RPTC	0.887	0.000	2.445			
RPTC2 <- RPTC	0.899	0.000	1.771	0.824	0.889	0.729
RPTC3 <- RPTC	0.770	0.000	1.853			
TCA1 <- TCA	0.742	0.000	1.573			
TCA2 <- TCA	0.859	0.000	1.864	0.819	0.879	0.647
TCA3 <- TCA	0.803	0.000	1.908			
TCA5 <- TCA	0.807	0.000	1.795			

The above table showed that indicators have loadings higher than the recommended threshold of 0.60 with a probability level below 5% and VIF also below 5% (Hair et al., 2022; Hair et al., 2011), establishing the fact that indicators have substantial reliability for achieving construct validity. Moreover, constructs have alpha coefficient and composite reliability higher than the recommended thresholds of 0.70 and 0.80, respectively (Hair et al., 2019). Therefore, construct reliability has been established. Lastly, the table has also shown that constructs have AVE coefficients higher than 0.50 (Hair et al., 2011; Hair et al., 2013), and thus, it can be concluded that there is a substantial degree of convergence between indicators and constructs.

Figure 2

PLS algorithm





Discriminant Validity

Discriminant validity helps to ascertain that the constructs are different and do not measure much variance in other constructs (Cheung et al., 2023). Table 3 shows the results of discriminant validity using FLC.

Table 3

Fornell-larcker criterion (FLC)

	CE	PBC	PNIC	RAC	RKAC	RPTC	TCA
CE	0.800						
PBC	0.619	0.876					
PNIC	-0.652	-0.664	0.823				
RAC	0.650	0.470	-0.590	0.880			
RKAC	0.605	0.268	-0.520	0.556	0.778		
RPTC	0.503	0.290	-0.175	0.633	0.409	0.854	
TCA	0.407	0.628	-0.677	0.491	0.392	0.117	0.804

CE = Community Engagement; PBC = Perceived Benefits of CPEC; PNIC = Perceived Negative impact of CPEC; RAC = Resident's Attitude towards CPEC; RKAC = Resident's Knowledge about CPEC; RPTC = Resident's Perception towards CPEC; TCA = Trust in CPEC Authorities

The above table showed that diagonally bold values (i.e., square root of the AVE coefficients) are higher than their respective correlation coefficients, providing that constructs have a higher degree of variance than their correlation with other constructs (Ab Hamid et al., 2017; Fornell & Larcker, 1981). Therefore, constructs have a substantial degree of divergence; thus, discriminant validity using FLC has been established. Table 4 shows the results of discriminant validity using the HTMT ratio.

Table 4

HTMT Ratio

	CE	PBC	PNIC	RAC	RKAC	RPTC	TCA
CE							
PBC	0.778						
PNIC	0.847	0.763					
RAC	0.835	0.531	0.692				
RKAC	0.708	0.330	0.579	0.622			
RPTC	0.605	0.295	0.254	0.700	0.466		
TCA	0.521	0.764	0.812	0.594	0.467	0.163	

CE = Community Engagement; PBC = Perceived Benefits of CPEC; PNIC = Perceived Negative impact of CPEC; RAC = Resident's Attitude towards CPEC; RKAC = Resident's Knowledge about CPEC; RPTC = Resident's Perception towards CPEC; TCA = Trust in CPEC Authorities

Henseler et al. (2016) and Henseler et al. (2015) suggested in their research that the HTMT ratio between two constructs should not exceed 0.90 to achieve an acceptable degree of divergence between them. In the above table, all HTMT ratios are below the recommended threshold of 0.90, establishing that constructs diverge substantially. Thus, discriminant validity using the HTMT ratio has been achieved.

Predictive Power and Relevance

Predictive power and relevance assess a model's ability to accurately forecast and explain future outcomes (Rasool et al., 2023). Table 5 shows the predictive power and relevance of the endogenous constructs using the PLS Algorithm.

Table 5

Predictive relevance

	R Square	Q Square
Community Engagement	0.524	0.501
Perceived Benefits of CPEC	0.386	0.201
Perceived Negative Impact of CPEC	0.433	0.363

The above table demonstrates that the structural model strongly predicted community engagement up to 52.4%, the perceived benefits of CPEC moderately predicted up to 38.6%, and the perceived negative impact of CPEC moderately predicted up to 43.3% (Chin, 1998; Cohen, 1988).

The table also demonstrates that community engagement is substantial in the structural model, up to 50.1%. In contrast, the perceived benefits of CPEC and the perceived negative impact of CPEC are moderately relevant, up to 20.1% and 36.3% in the structural model (Hair et al., 2013).

Structural Model

A structural model focuses on the causal structures involving latent variables to predict the connections between them (Burley et al., 2023). Table 6 shows the result of the direct-effect analysis for hypothesis testing using the PLS bootstrapping technique.

Table 6

Direct-effect analysis

	Estimate	S. D.	t-Stats	Prob.	Decision
CE -> PBC	0.623	0.037	16.677	0.000	Accepted
CE -> PNIC	-0.644	0.045	14.419	0.000	Accepted
RAC -> CE	0.319	0.078	4.081	0.000	Accepted
RKAC -> CE	0.322	0.058	5.533	0.000	Accepted
RPTC -> CE	0.161	0.094	1.680	0.093	Rejected
TCA -> CE	0.107	0.060	1.779	0.075	Rejected

CE = Community Engagement; PBC = Perceived Benefits of CPEC; PNIC = Perceived Negative impact of CPEC; RAC = Resident’s Attitude towards CPEC; RKAC = Resident’s Knowledge about CPEC; RPTC = Resident’s Perception towards CPEC; TCA = Trust in CPEC Authorities

The above table shows that community engagement (CE) ($\beta = 0.623$; $p < 0.05$) has a positive significant impact on the perceived benefits of CPEC. CE ($\beta = -0.644$; $p < 0.05$) negatively impacts the perceived negative impact of CPEC. Resident’s attitude towards CPEC ($\beta = 0.319$; $p < 0.05$) positively impacts CE. Resident's knowledge about CPEC ($\beta = 0.322$; $p < 0.05$) positively impacts CE. The resident's perception of CPEC ($\beta = 0.161$; $p > 0.05$) has a positive but insignificant impact on CE. Trust in CPEC authorities ($\beta = 0.107$; $p > 0.05$) also has a positive yet insignificant impact on CE.

Figure 3

PLS bootstrapping

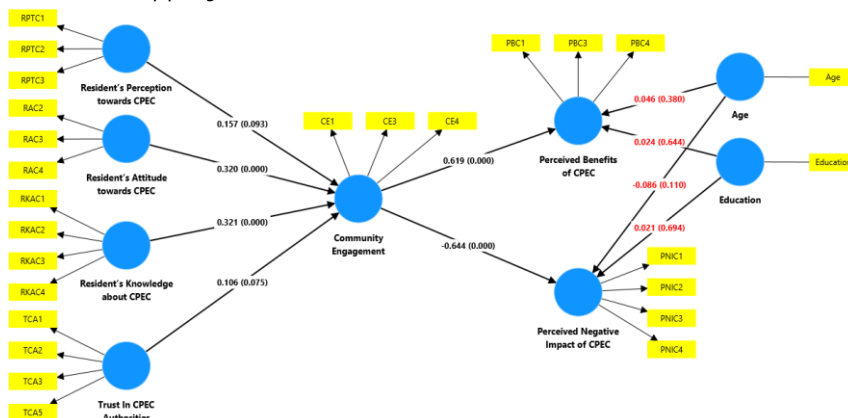




Table 7 shows the results of specific indirect-effect analysis for hypothesis testing using the PLS bootstrapping technique.

Table 7

Specific indirect-effect analysis

	Estimate	S. D.	t-Stats	Prob.	Prob.
RAC -> CE -> PBC	0.199	0.053	3.748	0.000	Accepted
RAC -> CE -> PNIC	-0.207	0.058	3.579	0.000	Accepted
RKAC -> CE -> PBC	0.200	0.035	5.629	0.000	Accepted
RKAC -> CE -> PNIC	-0.207	0.041	4.995	0.000	Accepted
RPTC -> CE -> PBC	0.100	0.058	1.680	0.093	Rejected
RPTC -> CE -> PNIC	-0.101	0.057	1.770	0.077	Rejected
TCA -> CE -> PBC	0.067	0.038	1.725	0.085	Rejected
TCA -> CE -> PNIC	-0.069	0.039	1.739	0.082	Rejected

CE = Community Engagement; PBC = Perceived Benefits of CPEC; PNIC = Perceived Negative impact of CPEC; RAC = Resident's Attitude towards CPEC; RKAC = Resident's Knowledge about CPEC; RPTC = Resident's Perception towards CPEC; TCA = Trust in CPEC Authorities

The above table demonstrates that community engagement (CE) ($\beta = 0.199$; $p < 0.05$) positively significantly mediates the effect of resident's attitudes towards CPEC (RAC) on the perceived benefits of CPEC (PBC). CE ($\beta = -0.207$; $p < 0.05$) negatively but significantly mediates the impact of RAC on perceived negative impacts of CPEC (PNIC). CE ($\beta = 0.200$; $p < 0.05$) positively and significantly mediates the impact of resident's knowledge about CPEC (RKAC) on PBC. CE ($\beta = -0.207$; $p < 0.05$) negatively but significantly mediates the impact of RKAC on PNIC. CE ($\beta = 0.100$; $p > 0.05$) positively but insignificantly mediates the impact of residents' perception towards CPEC (RPTC) on PBC. CE ($\beta = -0.101$; $p > 0.05$) negatively insignificantly mediates the impact of RPTC on PNIC. CE ($\beta = 0.067$; $p > 0.05$) positively but insignificantly mediates the impact of trust in CPEC authorities (TCA) on PBC. CE ($\beta = -0.069$; $p > 0.05$) negatively insignificantly mediates the impact of TCA on PNIC.

Discussions

According to the results, community engagement positively and significantly influences residents' perceived benefits of CPECs. It aligns with previous research that identified increased engagement levels, stating that people's understanding and appreciation of development projects increased with this level of engagement. According to Waheed et al. (2024), when community participation has been enhanced on large infrastructure projects, the perceived benefits are higher, while the resistance level is lower, and there is enhanced ownership of projects. In addition, Felzmann et al. (2020) pointed out that increasing community involvement leads to increasing citizen empowerment, which might result in participants' perceptions that they are getting even more from these programs.

According to the results, community engagement has a negative but significant impact on the perceived negative impact of CPEC. The studies conducted by Waheed et al. (2024) and Iftikhar et al. (2024) also explain that everyone's reservations about mammoth endeavors reduce when they are engrossed in decision-making processes and get relevant information in simple terms. A study of public infrastructure projects has shown that the participation of the community in planning helps address concerns and issues. However, Saqib et al. (2023) also pointed out that the fear regarding mega-projects by the general public and their lack of trust may be reduced by involving the public in mega-projects. One can note that stakeholders' concerns are recognized, diminishing the perceived negative consequences.

According to the results, residents' attitudes toward CPEC positively and significantly influence community engagement. This aligns with prior work that has established that people's favorable

perception of a given project increases the likelihood of their involvement and collaboration efforts. Public engagement is likely higher when residents' perceptions of the benefits of a project are positive, as indicated by an analysis of public participation (Zulfaqar et al., 2023). Similarly, it aligns with the theory of planned behavior whereby when people hold a positive attitude toward an activity, they will be willing to engage in it, for instance, by collaborating with others (Cho et al., 2023).

According to the results, resident's knowledge of CPEC positively and significantly impacts community engagement. Support for this idea is obtained from research done in the past whereby the sharing of information was believed to boost participation from the public. Development economics studies have found that people are willing to intervene and participate favorably when informed about the project's technicalities and future dynamics (Muhammad et al., 2023). In addition, people are likely to be involved when informed, and their input allows them to grasp how the project is relevant to their problems and interests (Siddiqui et al., 2023).

According to the results, resident's perception of CPEC has a positive but insignificant impact on community engagement. In various studies, it is said that perceptions are the main reason that encourages participation. This cuts against the various studies, with emphasis on the following. However, in mega gigantic projects with governmental support, like CPEC, communication and transmission might assume even more important roles regarding engagement (Ullah et al., 2023). Other findings made during the research noted that public opinion may have a limited effect on projects that the government backs. In these sorts of endeavors, several formal technologies for community involvement often contribute far more to the cause of participation than tenor-based impressions (Gao & Zhen, 2023).

According to the results, trust in CPEC authorities has a positive but insignificant influence on community engagement. According to Haider et al. (2024), confidence can erode when officials are not open with the public or do not do enough to include them in government initiatives. On the contrary, according to Saqib et al. (2023), it is frequently more important to connect directly with the community, communicate clearly, and address local concerns to motivate their involvement. This means that people may still pay a premium on how the authorities act to meet their problems and wants, even when trust exists.

As per the study's findings, the effect of residents' attitudes towards CPEC on the perceived benefits of CPEC through community engagement is positive and significant. Perceived advantages through community engagement are positively and significantly impacted by locals' sentiments towards CPEC. Zulfaqar et al. (2023) have shown that when people have a positive attitude, they are more likely to engage, increasing their impression of the project's benefits. Participation from the community mediates conflicts by opening lines of communication and lowering levels of ambiguity. Attitudes influence behaviors like community engagement, which affects views, as stated in the theory of reasoned action (Harb et al., 2024). This elucidates the relationship between positive attitudes, increased involvement, and, finally, a heightened awareness of the advantages of CPEC.

As per the study's findings, the effect of residents' attitudes towards CPEC on the perceived negative impact of CPEC through community engagement is negative but significant. Muhammad et al. (2023) also noted that positive feedback enables people to participate. Hence, awareness levels of the advantages of the project increase while concerns about the disadvantages are dampened. This is significant for CPEC since people are usually skeptical about big projects. In the view of Aghakhani et al. (2023), when people have more positive perceptions because it enhances their perceptions of people who participate in decision-making. CPEC has maintained clear and transparent relations with the local communities and has never faced any socio-political challenges that could have hindered public support and easier project implementation.

As per the study's findings, the effect of residents' knowledge about CPEC on the perceived benefits of CPEC through community engagement is positive and significant. This implies that those who adopt the source of information that exists or are well-informed tend to engage and gain more value from it. As per Muhammad et al. (2023) on public knowledge and engagement, informed people can come forward for community ventures like CPEC and appreciate the worth of such projects. Luhombo et al. (2023) noted that



according to Freeman's theory of stakeholders, this opinion makes much sense, too, as people will always engage to improve, especially when the project's perceived benefits are well publicized.

As per the study's findings, the effect of residents' knowledge about CPEC on the perceived negative impact of CPEC through community engagement is negative but significant. This is supported by previous study in this area revealing that people living in the CPEC-affected area and who have more information on it are less likely to estimate adverse impacts of mining over and are in a better position to assess risks of any mining activity rationally (Waheed et al., 2024). The Risk Information Seeking and Processing (RISP) model also suggests that knowledgeable individuals should search for accurate information in settings where opposition stems from distortions or lack of information. Another fact is that these assessments are much more rational and contain balanced estimations of the pros and cons of the project (Liu & Yang, 2023).

As per the study's findings, the effect of residents' perception of CPEC on the perceived benefits of CPEC through community engagement is positive but insignificant. In CPEC, in the case of projects, it has been argued that perceptions may not necessarily cause involvement as posited in the literature. Engaging and informing the community is critical for sustaining large-scale projects such as CPEC; goodwill is insufficient (Aziz et al., 2023b). However, research on the CPEC has shown that positive perceptions of locals could remain free if there is no proper transparency in the communicate, and it appears to address local concerns (Ullah et al., 2023). In line with this is the Jensen and Sandstorm work of engagement, where there is a call for actual activities like focused community arrival over perceptions (Valentinov & Roth, 2024).

As per the study's findings, the effect of residents' perception of CPEC on the perceived negative impact of CPEC through community engagement is negative and insignificant. A previous study showed that to modify the negative attitude in big infrastructure projects like CPEC, direct interventions, such as information exchange and trust-building measures, are always needed (Ullah et al., 2023). Thus, it becomes apparent that to counter opposition or skepticism, there is a need for more than positive attitudinal factors. This is well supported by Lewin's theory of change, where it is established that initial interest does not guarantee long-term engagement (Batoool et al., 2024). They can be effective only if accompanied by change promotion techniques such as openness, regular communication, and community engagement. These activities ensure that local problems are attended to and simultaneously develop sustainable support among the stakeholders (Gao & Zhen, 2023).

As per the study's findings, the effect of residents' trust in CPEC authorities on perceived benefits of CPEC impact of CPEC through community engagement is positively insignificant. Similar to prior studies, this outcome supposes trust is not always the key to CPEC projects because open and honest communication and concrete advantages are often more salient (Saqib et al., 2023). Luhmann's theory of trust indicates that while it might be established on institutional terms, it may be supplanted by other factors, such as the outcome of a certain project. The perception of the project performance and the engagement of the stakeholders in CPEC projects may be influenced by their perception of using tangible benefits and having specific guarantees rather than the abstract type of trust (Mehmood et al., 2024).

As per the study's findings, the effect of residents' trust in CPEC authorities on the perceived negative impact of CPEC through community engagement is insignificant. This discovery aligns with the difficulties caused by its magnitude and geopolitical consequences. As Mayer's trust theory demonstrates, the importance of trust in addressing CPEC problems cannot be overstated (Ullah et al., 2023). It is more important to promote openness and keep the lines of communication open. These steps show dedication and transparency, which ensure stakeholders and the general public reduce skepticism and increase faith in the project's results and goals (Abb, 2024).

Conclusion and Recommendations

Conclusion

The study concluded that CE significantly influences both the perceived benefits and perceived negative impacts of CPEC. Furthermore, the study finds that resident's attitude towards CPEC and their knowledge about CPEC positively and significantly impact CE. However, residents' perception towards CPEC and trust

in CPEC authorities show a positive but statistically insignificant impact on CE. The study also examines the mediating role of CE in the relationships between residents' attitudes, knowledge, perceptions, and trust regarding CPEC and the perceived outcomes of the initiative. The results demonstrate that CE significantly mediates the effect of residents' attitudes and knowledge on the perceived benefits of CPEC. Similarly, CE negatively mediates the impact of residents' attitudes and knowledge on the perceived negative impacts of CPEC. Conversely, the mediation effect of CE is positive but insignificant for the impact of residents' perceptions and trust in CPEC authorities on perceived benefits and negative but insignificant for their impact on perceived negative impacts.

Recommendations

Policymakers should explore how residents in Balochistan and GB can be effectively consulted. There should always be follow-ups and feedback sessions so the residents can voice their opinions and know they are being listened to. This can be done through town meetings, focus group discussions, community meetings, and other consultative meetings, which will assist in establishing mutual trust.

Similarly, policymakers should develop communication strategies that are sensitive to Balochistan and GB cultures and regions. Concerns common to the different communities should be highlighted in the communications, particularly those related to resource use and socio-economic costs. The local languages and mediums of communication should be adopted so that inadvertent mistakes due to interpretation do not occur and missing information about CPEC projects does not hamper growth.

Moreover, a proper reporting system should be in place so that there is no kind of consideration when it comes to CPEC projects formulated by policymakers. The other project requirements should be communicated by communicating the project's status and expanding and publicizing the outcomes of the activities. This will be supported by the independent oversight bodies that will be established to monitor the process of implementing this project and address any compliances or violations of the promises or any grievances from the clients.

Furthermore, policymakers should examine the economic effects of CPEC projects to prevent the loss of development in the affected regions. Essentially, specific adjustments must be made to enhance the extent of coverage of relevant programs and intended groups in these areas or regions. For instance, support local development projects as the key stakeholders in CPEC, train and employ the local population, and help the local firms bring operational functionality to the CPEC initiative for maximum socio-economic benefits.

In addition, policymakers should provide a structure for the constant assessment of CPEC's effects on the communities and people of Pakistan. Share new information about project implementation and existing policies with the target audience to make relevant modifications. This will be a cyclic process to enable the identification of new threats and opportunities informing the optimization of CPEC outcomes and the minimization of their adverse effects.

Limitations and Future Research

There are several limitations to the study that need to be considered. Initially, the generalization of the findings could be a significant weakness of this research as the study employed a quantitative approach and survey method to gather the perceptions of the residents of Pakistan. Surveys offer established opinions that might skew or disregard a minority or specific market attitude. Such a limitation could be resolved in future research by employing quantitative and qualitative approaches, like interviews or focus groups, to encompass a deep perspective on community perceptions. Also, the other limitation that may be mentioned is the small sample size or focus on a particular region, which reduces the external validity. Although operating at a higher level of complexity and requiring substantial sample sizes, adapting PLS-SEM might not capture variations across multiple regions of a diverse population. Future research should recruit more participants from other regions of Pakistan to make the research more generalizable. Moreover, using a longitudinal style could help understand the dynamics of perceptions and attitudes on the impact of CPEC.



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