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Perception of Employees Regarding Employment Opportunities Created under CPEC: A Case Study of Coal Fire and Solar Project in Punjab, Pakistan

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ABSTRACT

Purpose: CEPC is a mass investment for the struggling economy of Pakistan as it opens up new avenues of opportunities. The current study aims to probe employees' perception working in coal power projects in central and south Punjab under CPEC.

Research Gap: The infrastructure investments in any economy are evaluated generally or partially through cost benefit analysis or cash flow criterion. Response of target population is more often not evaluated through primary survey. This study is novel in its nature to know the perception of the employees working in two power projects installed in central and southern Punjab, Pakistan.

Design/Methodology/Approach: The study is based on primary data collected through well-structured questionnaire from employees. Descriptive analytical method and Ordinary Least Square (OLS) estimation method are adopted for analysis. Four indices of multiple opportunities are constructed using Principal Component Analysis (PCA).

The Main Findings: Results of the study portray key importance of education to enhance opportunities under CPEC. Findings do support that multiple opportunities created under CPEC and social change in the surroundings of installed projects also create employment opportunities.

Theoretical/Practical Implications of the Findings: Findings of the study emphasize skill development in labor force so that more benefits can be achieved from investments in various projects of CPEC. A close linkage between educational institutes and industry seems a necessary policy implication.

Originality/Value: The study is novel in exploring the employees' perspective regarding employment opportunities created under CPEC for the power projects installed in central and southern Punjab.

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1. Introduction

Pakistan has a strategic geographical location to connect countries on Silk Road through a mega project, One Belt One Road (OBOR). Pakistan is nonetheless an optimal choice to develop economic corridor with China (Nogales, 2014). The regional connectivity covers greater southern part which mainly includes China, Afghanistan, Iran and is stretched till Myanmar (Chaziza, 2016). The political and economic interests of both countries are mutual, as various macro projects are the part of OBOR initiatives spreading over Asian and African countries (Lim, 2009). More specifically CPEC is the part of belt and road initiatives. This project consists of many micro and macro level plans like energy, infrastructure and industrial parks (Gholizadeh et al., 2020). Various studies focused on the effects of the project for transformation of connected countries to view their height of development (Flint & Zhu, 2019). Eventually, the regional connectivity will be enhanced. A few studies focused on the mainstream of project which involves cost and economic efficiencies for encouraging economic development in the region (Shariatinia & Azizi, 2017; Zhang, 2015). Bearing in mind, the benefits and success of any project, the perception of local benefits cannot be ignored. A few previous studies also focused on perception on local residents but the perception of local employees preferably living within a particular radius of 15 km² and employed in nearby energy projects (solar power at Bahawalpur and coal power at Sahiwal) will be more useful in study, especially in terms of employment accrued to locals. Eventually, the perception of local employees in these projects make someone deeply comprehend the success or development of CPEC project. In Pakistan CPEC is considered for providing new significant pathways to economic development and to resolve the energy crises (Akber, 2015). However, CPEC is considered to be a joint venture of developmental projects by China and Pakistan commenced to achieve high economic growth in both countries by providing benefits to local communities (Kanwal et al., 2019). The mutual friendly relationship between two countries are coevolving around collaborative economic scenario and energy security concerns. This corridor is somewhat not a roadway, rather it is a consolidated indication of multidimensional projects (Rizvi, 2014). The estimated budget of CPEC is US \$60 billion which includes the domestic share of US \$18.1 billion. Thus, unemployment will reduce in Pakistan as it will create approximately 70,000 jobs for Pakistanis (Khurshheed et al., 2019). Factually, this corridor is the form of regional integration evolving around numerous players paving the way towards globalization. It is shifting the paradigm to 'economics' from 'security' Economic strength is a vital factor for economic development (Khan et al., 2016). Notwithstanding, modern energy sector translates into energy security which can mitigate the relevant climate risks. Globally, rise in human population is expected by two to three billion till 2040 (Castellano et al., 2015). The increased human population will require an increase in per capita income which is possible through more income opportunities to meet the challenges in sustainable development goals.

Generally, investment is considered a route to employment generation. CPEC is also perceived to create employment to locals. Government and policy makers perceive multiple benefits of CPEC including employment opportunities to locals (Kanwal et al., 2019). This research specifically fills the gap by examining the perception of local employees about the benefits of CPEC and its related development. In a nutshell, Pakistan faces big challenge in achieving economic and social goals along with resolving the issue of creating employment opportunities. Policy makers have set targets for improvements at macroeconomic front in Pakistan but unemployment is still a serious constraint to economic growth. Investment and energy projects of CPEC will provide employment opportunities to locals and will route the country to economic growth. Not only this, energy sector improvement will also provide power to enhance investment (Isran et al., 2019). Hence, the project is identified as a flagship project by policymakers of Pakistan. The pendulum of project will swing smoothly to resolve the energy shortfall issue on one side and to earn foreign exchange reserve through installation of new industries on other side. The expected technological advancement in Pakistan through transfer of technology will raise the capacity of country to compete in international market (Wasim & Siddiqi, 2018). Likewise, uninterrupted power supply will promote the establishment of special economic zones which otherwise is also a successful initiative for creation of jobs and promotion of trade (Khan et al., 2016).

The perception of local employees within a particular radius in CPEC projects needs be studied for knowing the indebt benefits of these projects at community level. Therefore, unleashing the community based benefits in terms of employment and investment can facilitate the project activities to realize the macroeconomic plans of developmental projects (Chen, 2000). From social point of view, unemployment means wastage of precious labor resources of the country which needs to be carefully tackled. This is second time in history of Pakistan that a huge foreign funding is participating in development programs. The first time a huge investment was received in late 1960s when the country built Indus water replacement works and it is second time now when Pakistan is receiving investment plans financed by China.

Theoretical underpinnings of this study revolves around social exchange theory (Sinclair-Maragh et al., 2015). Though the study is based on economic goals to be achieved by CPEC projects, yet the realization of these goals is through societal indicators. The social exchange theory proposed the positive perception of locals for realization of advantages of projects, supports the project in multiplicative ways. The multiplicative ways support the project in reciprocation. The findings of the study through the supportive perception of local employees will help the country to carry out other CPEC projects along with these two power projects (under study). Employability demands fortification of economic and social wellbeing of masses. CPEC has got the recognition of regulating parameter that can embrace existing and future cohorts (Laws et al., 2004; Scholz & Binder, 2011). Employability is a centralizing thought revolving around social change among people through power projects installation and multiple other opportunities created by CPEC. The elementary dimension for employability which signifies both power projects under study is education level of local employees especially who belong to the radius of 15 km² within the area, where power projects are installed. Such scenario may lead to economic escalation (Naz et al., 2018).

So, the prime objective of this study is to examine the employability impact of two power project. The secondary objective is to find the change in employment oriented (socio-economic) indicators through the opinions of workers (employees), who live within the radius of 15km² of both projects. This study is conducted in a short duration of time (3 to 4 months), for the two power projects initiated before a few years. Their multiple benefits can be realized after a few more years. Section 2 portrays the literature review, section 3 is based upon methodology of the study. Section 4 provides the results and discussion whereas section 5 concludes the study.

2. Literature Review

CPEC will affect the quality of common man's life by bringing change in their socio-economic wellbeing (Ali et al., 2017). CPEC projects will boost the industrial growth and will upsurge the household's welfare (Naz et al., 2018). It is claimed that CPEC will enhance progress of SME's in the economy which will directly and indirectly affect the local population (L. Ali et al., 2018). Arguably, governments of both countries claim for generation of employment opportunities. Moreover, CPEC routes will also connect rural areas to big cities which will further help in generating employment opportunities, reducing poverty and improving common man's life. CPEC may also facilitate local non-governmental organizations to work which will promote the social welfare, affecting the living style of a local citizen (Ahmad et al., 2018). Poverty can be mitigated through employment generation (Anwar et al., 2018). Millions of jobs in various sectors including power sector will help in reducing poverty and bringing social change through this mega project (Chen et al., 2018). CPEC is the potential project to create employment opportunities in energy, construction and infrastructure sector.

CPEC is giving images of threats and opportunities to local producers (Isran et al., 2019). The installation of energy projects is the blossoming opportunity to resolve the energy crises under CPEC. In the similar vein, establishing industrial zones, is a vast economic opportunity for Pakistan to not only uplift its economic activities but also to build its national image. This novel opportunity will bring through technological advancement in industrial arena provided that no controversial issue upon location of the zones should be raised (Tong, 2014). Moreover, the micro and macro level benefits including employment opportunities for people of Pakistan, better quality of life through reduced poverty levels can be achieved (Saad et al., 2019).

Concisely, the researchers and academicians have remained concerned with the impact of infrastructure development since decades. Other sectors of the economy in general whereas power and industrial sector in particular get the spill overs of positive externalities associated with development of infrastructure in the economy. Henceforth, productivity, wellbeing improvement and employment generation may be envisaged by infrastructure development considered under the impact of CPEC. Even though analysis of economies of threats and opportunities of CPEC is conducted and conclusively the ability of CPEC to be a game changer is highlighted (Javaid & Jahangir, 2015). However, the evaluation of Chinese projects under Chinese outward foreign direct investment conducted for the period from 2009 to 2014, concluded that all the Chinese projects remained successful (Mumtaz et al., 2017).

A survey research was conducted at BS (Bachelor) and MS (Master) level students from different universities of South Punjab to get their opinion about CPEC to be identified as game changer (Akbar et al., 2021). This qualitative research explored how CPEC can help in resolving the issue of energy crises and lack of industrial capabilities in Pakistan. This questionnaire based research was in fact opinion based and concluded that CPEC can be helpful in fulfilling energy requirements and in promoting industrial sector. In the similar vein, utility and concerns of CPEC on different sectors of Pakistan's economy are also analyzed in another study based on qualitative research. This qualitative research analyzed CPEC's impact on employment in Pakistan, Pakistan's GDP, foreign direct investment and per capita income in the country (Khalil et al., 2021). Conclusively, the results provided that aggregate benefits will be taken by not only both Pakistan and China but also by neighboring countries in the region.

Resultantly, interviewee's data is the target for analysis in this study. This will provide scenario of employment opportunities to locals and multiple other benefits will also be assessed.

3. Methodology of the Study

There are several methods which can be applied for selecting suitable sample size. Application of Gorsuch's rule is observed in this study (McGehee & Andereck, 2004). The rule suggests that sample size should be more than five times the number of questions used in the study. There are 20 questions used for analysis and estimation in the study so the resulting sample size need to be at least (20*5=100). Another methodology also endorsed the acceptability of sample size (Peters et al., 2018). In this study 100 Pakistanis respondents are taken from solar power project at Bahawalpur and the same number is also taken from coal power project at Sahiwal which seems fairly valid.

Another sample selection method suggesting variability of the elements of the respondents providing representation to all the sampling units is considered. Since, population and its variability is not been determined through basic survey. So, the guessed variability considering 50 percent to have maximum sample size, is used in statistical formula to have representative sample from the large population is given below:

$$n = \frac{Z^2 V^2}{e^2} \tag{1}$$

Where, Z is normal variate (1.96); V is guessed variability of sampling units with 50 percent for maximum sample size; e is deemed error (10 percent). Considering the value of elements: $n = \frac{(1.96)^2 (50)^2}{(10)^2} = \frac{3.8416 \times 2500}{100} = 96.04$. The sample size is 100 for each project. Considering the respondents from both site areas of two power projects the total sample size is 200. Participants were free to give their consent as they were briefed for confidentiality of their opinions.

3.1 Measurement

Many previous studies conducted to know the perception about performance of international project were consulted to give appropriate measurement to variables (Jurowski, 1994; McGehee & Andereck, 2004; Yoon et al., 2001). The most appropriate scale used is the five points Likert scale (1= strongly disagree to 5= strongly agree).

5= strongly agree). It is considerably a valid scale for such studies (Cheng, 2016; Gursoy et al., 2017). Finally, the clarity of expression was checked in the questions.

At first stage descriptive analytical narrative methods is employed then OLS (Ordinary Least Squair) estimation procedure is adopted to find the impact of relevant indicators on employees’ perception for EO. Primary data is collected through structured questionnaire from employees of both projects at sites. The study goes through two-stage sampling, firstly cluster sampling and then purposive sampling techniques are adapted to collect data. The study will provide an analysis based upon the opinion of locals (employees) in the identified clusters around both power projects.

Using Principal Component Analysis (PCA) in response to relevant questions, four indices are constructed for multiple opportunities created under CPEC (MO), social change (SC), power projects (PP) and employment opportunities (EO).

Table 1 provides information about respondents in terms of their level of education and their area of belonging (within or out of 15 KM2 radius), which indicate the participation of many local employees across both areas where solar and coal power projects (under study) are located.

Table 1: Descriptive Characteristics of Variables

Variables	Var/Groups	Bahawalpur (%)	Sahiwal (%)
Education Level (EL)	Illiterate	26	26
	Matric	32	28
	Intermediate	9	12
	Graduate	7	12
	Graduate and above	26	22
Area belongs to (AB)	Within 15-KM2 Radius	75	79
	Out of 15-KM2 Radius	25	21

Source: Data collected by primary survey

The table 1 also depicts that majority of sampled respondents are less than or equal to matric in qualification which is 32% and 28% for Bahawalpur and Sahiwal power projects respectively. It is also clearly indicated that majority of sampled respondents are local employees and belong to the area (within radius of 15 KM2) which is 75% and 79% for Bahawalpur solar and Sahiwal coal power projects respectively.

The model specified for perception of workers for employment opportunities is as under:

$$EO = f(MO, SC, PP, Edu\ levels, areabelong) \tag{2}$$

AS the value of all the indices are likely to be continuous including dependent variable. So, the model is estimated through OLS because it is best and unbiased to estimate the model of perceived employment opportunities in CPEC projects. Moreover, to avoid the problem of heteroscedasticity, robust standard errors are reported. The validity of indices, constructed through PCA, is checked using Kaiser-Meyer-Olkin Measure of Sampling Adequacy.

4. Results and Discussion

The coal fire project is initiated in district Sahiwal, and Quaid-e-Azam solar park is in district Bahawalpur, Punjab, Pakistan. Sahiwal coal fire project is completed with operational capacity of 1320 MW incurring total cost of US\$1802 million. Solar Park at Bahawalpur is in progress since it has attained a capacity of 300 MW in August 2016 and is also connected to national grid. Both sites are urban areas of province. Bahawalpur division has Cholistan desert in its territory. It is a sandy area and is exposed to sunlight for longer hours, round the year. Sahiwal district has multiple connectivity with rail and road routes towards various industrial centers of Punjab and Sindh provinces.

4.1 Analyzing Perceptions

Table 2 portrays validity of variables to include in estimation.

Table 2: Validity of Indices constructed using PCA

Indicator	Kaiser-Meyer-Olkin Measure of Sampling Adequacy	Significance
MO	0.673	0.000
SC	0.692	0.000
PP	0.712	0.000
EO	0.701	0.000

Source: Author’s compilation from estimations through software STATA 15

Table 3: Linear Regression

Number of Observations = 200; F (7, 192) = 44.22; Prob > F = 0.0000; Root MSE = 0.70906

Employment Opportunities (EO)	Coef.	Robust Standard Error	T	P > t	95% Conf. Interval
PP	-0.053	0.056	-0.950	0.343	-0.163 0.057
MO	0.242	0.050	4.870	0.000	0.144 0.340
SC	0.274	0.068	4.030	0.000	0.140 0.408
EL					
2	0.273	0.150	1.810	0.071	-0.024 0.569
3	0.506	0.199	2.540	0.012	0.114 0.899
4	1.188	0.167	7.120	0.000	0.859 1.517
AB	0.092	0.115	0.800	0.426	-0.135 0.318
_Cons	-0.469	0.095	-4.910	0.000	-0.657 -0.281

Source: Author’s compilation from estimations through software STATA 15

Prime objective of this study is the assessment of perception of local employees in terms of indebt benefits of the CPEC projects. Purposefully, two power projects , Bahawalpur solar power project and Sahiwal coal power project have been chosen for recording the perception of local employees in order to know their thinking for accepting the CPEC project, findings of this study matches with other studies (Khalil et al., 2021). In this regard the perception of locals about employment opportunities generated due to multiple opportunities created under CPEC, social change brought under CPEC, power projects installed under CPEC have been considered. The study was based on primary data collection which was personally administered.

Truthfully, it is attractive for China to establish this project (CPEC), primarily to deal with economic and trade matters with other countries which involve the tackling of boosting energy needs and increased exports. The CPEC is enriched with multiple opportunities which also fortifies the cost effective interest of capitalization by regional achievers (Chawla & Iqbal, 2020). CPEC will lead to upsurge the development and production through economic uplift which will prove to be a turning point in reducing poverty (Ahmed & Mustafa, 2016). Pakistan had been experiencing an energy shortfall, reduced agriculture output, and suffered a drop off in overseas business. Many industries shut down, the country suffered high inflation rate and fall in Gross Domestic Product (GDP) which eventually increased poverty (Y. Ali et al., 2018). Now, CPEC is offering promising scenario to get rid of such disaster through many energy projects (Awais et al., 2019). Henceforth Pakistan will grow as an economic nucleus through expanding infrastructure via uplifting economic progress. All the above might provide employment opportunities to masses through establishing energy and power projects.

This study investigated, how the social change created through CPEC in the area, power projects installed under its hegemony and multiple other opportunities created under CPEC affected the employment opportunities availed by locals in both power projects. The empirical data was collected from individuals employed in solar power project at Bahawalpur and coal power project at Sahiwal. A few prior studies also unveiled the importance of CPEC and its contribution in employment generation by relying on qualitative data gathered through conventional interview technique (Hussain, 2019; Khan, 2019; uddin Ahmed et al., 2019). Henceforth the findings of this research study are viable for policy makers and practitioners. The study has theoretical foundation from social exchange theory which gives importance to the perception of locals to make the project beneficial. The local community become supportive if they perceive the project vital, otherwise the development of such projects are to face the opposition from locals. It is found that improvement in quality of life of local employees is observed through CPEC development which in turn is positively contributing in employment opportunities availed by locals (Yu et al., 2018). The results of the study also show that social change brought under CPEC projects and multiple other opportunities created under CPEC, impact the employability scenario significantly. Putting differently, installation cum commencement of new projects improve the life standards of locals, especially if they get the chance of employment in the projects (Haq & Farooq, 2016). Although many workers responded that new projects and international resources bring forth novel opportunities for the betterment of locals which are akin to another study (Hansen et al., 2016). However, the results of estimation show that overall, the employees perceive insignificant impact of both power projects due to capital flight and brain drain. As this study is based on only two power projects and the sampling units were also inquired about improvement in quality of life through multiple questions. Generally, the local employees agreed that numerous benefits of CPEC like poverty reduction and enhancement in social welfare will be observed.

The respondents of both projects are optimistic for more employment opportunities to be created through CPEC in their regions. Henceforth, local employees (respondents) perceive that higher level of education are can remain a significant important pillar for generating employment. So, the results become robust when the education level increases. Creating employment opportunities is irrespective of the region or area, the employee belongs to. Concisely, F test of this model is significant.

Table 4: Variance Inflating Factor Analysis

Variables	VIF	1/VIF
PP	1.02	0.981
CO	1.01	0.987
SC	1.87	0.534
EL	?	?
2	1.3	0.769
3	1.97	0.509
4	1.9	0.526
AB	1.28	0.783
Mean VIF	1.48	

Source: Author’s compilation from estimations through software STATA 15

No-multicollinearity problem is found in the model as the max value for one of the factor is 1.97 whereas the mean value of VIF is 1.48. The results are given in table 4.

5. Conclusion

This study is based on the aim of collecting empirical data from local employees working in two energy projects, Bahawalpur solar power project and Sahiwal coal power projects. The findings portray the optimistic view of local employees who perceive that CPEC will enhance the employability in the country through bringing social change and multiple other opportunities created under CPEC. Accordingly, these are not only the power projects which can significantly add in employment scenario of the country but education of the labor force is also a viable factor to improve the employment frontier. The employees in

both projects have different levels of education whereby majority is either matriculate or graduate. Furthermore, many employees are un-skilled. Precisely, most of the respondents are optimistic for socioeconomic situation after the inception of projects. Policy implications go in favor of increasing education level to get multiple benefits or employment opportunities created through CPEC.

Moreover, policy makers should also focus skill level development in labor force to reap the benefits of investments projects created under CPEC. A close linkage between industry and educational institutions will grease the process.

There is a need to conduct further multidimensional research on CPEC in Pakistan for assessing the solidity of its impacts. Conducting micro level studies for collecting information regarding the uplift in livelihood of residents across the routes and around installed projects. The further deep dwelling research with appropriate analysis, monitoring and evaluation with the special focus on employment generation under all job classification may also remain optimal. Think tanks in Pakistan should re-assess the relevant entities to circumvent apprehensions and contradictions. Priorities of both countries China and Pakistan should correlate the ultimate targets of investment, infrastructure, income and employment to attain the higher benefits of CPEC.

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