Journal of Contemporary Macroeconomic Issues *ISSN (Print) 2708-4973*
December 2023, Vol. 4, No.2 [91-105] *ISSN (Online) 2709-0469*

DOI: 10.5281/zenodo.10377657

Journal of Contemporary Macroeconomic Issues
www.sceker.org

Contemporary Macroeconomic Issues in Human Development Through Electricity Access and Institutional Quality: Evidence from South Asia

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PAPER INFO

Information:
Received: 21 October, 2023
Revised: 13 November, 2023
Published: December, 2023

Keywords:
Macroeconomic issues, human development, electricity access, institutional quality, South Asia

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ABSTRACT

The contemporary issues in macroeconomics involve restructuring policies and redistributing resources. The reformulation of policy aims to enhance human welfare. This led to shedding light on the importance of institutional contribution to better provision of social assistance for human development, such as electricity access. The current study aims to identify the impact of electricity access on human development with the interaction of institutional quality in South Asian countries. The data used for the investigation ranged from 1996 to 2021. Having observed the existence of cross-sectional dependence as well as heteroscedasticity in its trend, the Driscoll-Kraay (D-K) technique was used in this study. This study runs 3 distinct models for South Asian countries in a macroeconomic framework. The findings indicate the variables' stationarity results are mixed and cointegration exists between variables. Moreover, the major results of the D-K model concluded that access to electricity with institutional quality has long-term positively and significantly impacted the human development index. Both jointly contributed to social and economic progress, improved health systems, lower poverty, and a slew of other enhancements that boosted human development levels more swiftly and efficiently. Thus, governments may create an atmosphere that promotes human growth by increasing electricity access and improving the quality of institutions.

1 Introduction

There are different indicators to assess "development" like GDP, per capita income, growth, etc. The United Nations Development Program attempts to prioritize human welfare over the development of the national economy by using the human development index (Klugman et al., 2022). The HDI is determined by 3 factors: per capita income, education, and life expectancy, and is the most extensively used indicator of welfare. As an objective indicator of well-being, the HDI is used to assess the effects of economic policies on people's quality of life. Its goal has been to serve as a framework for reference for both social and economic growth (Kinnunen et al., 2019). To create a better society, the relationships between sustainable growth and social development are complementary (Jain & Jiian 2020). Even if all of the Sustainable Development Goals (SDGs) are accomplished by 2030, global development will not come to a complete stop. The same worries will persist. The Human Development Report is crucial in ensuring that we maintain an eye on the future (Conceição 2019).

There are 3 pillars of SDGs communal, environmental, as well as economic and HDI covers two (economic and social) of them.

Although many factors can contribute to improving HDI energy has a crucial role in every field of life. The access to electrical energy and a nation's economic development are closely related. Economic activity depends heavily on electricity, both in the creation and use of products and services (Suryanto et al., 2023). Constraints on easy access to energy sources include those related to availability, accessibility, price, and adaptability. Each of the constraints mentioned above is made up of various matrices. By removing these obstacles, an area can have a secure energy supply, which eventually affects the development plan (Ray et al., 2016). Access to electrical energy is a fundamental social right and an important precondition for eradicating poverty meanwhile its energies the vital economic activities (Zhang et al., 2019). The modeling of electricity consumption can be improved by revealing the association between energy and socioeconomic expansion. Given the importance of electricity access for development indicators, the present study aims to determine the effect of access to electricity on the HDI.

Electricity accessibility contributes to each of the SDGs. A key element of SDG 7, which seeks to guarantee that all individuals have accessibility to reasonably priced, reliable, and contemporary energy services, is power access (McCollum et al., 2018). It can reduce poverty by providing business opportunities, SDG 1. It can contribute to SDG 3 and 4 by improving the health and education facilities of a society. The provision of clean water and sanitation (SDG6) is not possible without electricity accessibility. Given the importance of electricity access for development indicators, the present study aims to determine the effect of electricity accessibility on the HDI.

Numerous issues with the South Asian Region (SAR) temporarily impact the country's energy system. Long-term downtime and frequent unplanned outages are the result of the electricity supply failing to keep up with the necessary expansion and demand (Rehman & Deyuan 2018). This study focused on Pakistan, Bangladesh, and India SAR countries to examine the connection of energy access with social growth. All of these nations facing inflation and high electricity demand due to the current globalized situation. Commodity prices rose sharply in 2021 and the first few months of 2022, driven mostly by the conflict between Russia and Ukraine. The International Energy Agency (IEA) claims that the economic the COVID-19 pandemic's recovery and exceptional climatic circumstances resulted in a sharp increase of more than 6% in electricity demand in 2021 (IEA 2022). The electricity production growth remained at 7.2%, 5.5%, and 3.9% in Bangladesh, India, and Pakistan respectively. All these economies also generate electricity from renewable sources (BP 2023).

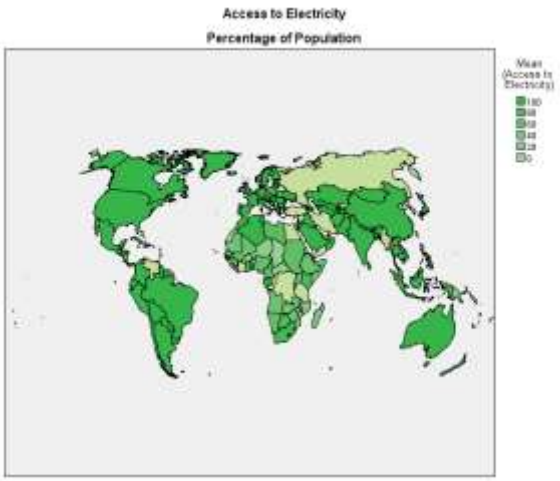

Figure 1
Access to electricity, Source *World Bank*

Access to electricity also varies across these Asian countries as Pakistan listed at 41st number (94.92% of the area has electricity access), India stood at 35% (99.57%), and Bangladesh at 38th number (98.99%) (The global economy 2023). Over the past year, there have been several issues with affordability and security affecting electricity networks. The energy crisis and market conditions will increase the average cost of providing electricity over the world by nearly 30% in 2022. In the same year, the amount of people who do not have electricity access is predicted to increase for the first time in decades, hitting 760 million people. The number of individuals without access to power has increased recently due to the COVID-19 pandemic's effects and Russia's invasion of Ukraine, returning the situation to what it was in 2019. The number of persons who do not have electricity accessibility may be declining in 2023, even though at a slower rate than before the epidemic, according to recent IEA data and analysis (IEA 2022). The situation of electricity access all over the world in 2021 is visually represented in a map.

All countries in this study have gone through electricity crises since their independence. As far as Pakistan is concerned, the practice of "load shedding" the electrical power sector failed due to inadequate capacity being added, old factories having inadequate transmission networks, as well as inadequate accounting practices. The 2nd country of this study also faces electricity access issues as 76 percent of families experienced unexpected supply disruptions. Outages occur a minimum of once daily, affecting two-fifths of urban and two-thirds of rural homes. The length and intensity of power outages are greater in Uttar Pradesh, Haryana, Bihar, Assam, and Jharkhand (Agrawal et al., 2020). Bangladesh has a limited supply and variety of energy sources. Bangladesh's current per capita electricity usage is about 348 kWh, far less than the 3,065-kWh global average (Islam et al., 2021).

Along with electricity access, previous studies also considered other factors that affected HDI like inequality, governance, and energies like renewable as well as non-renewable (Wang et al., 2018; Li et al., 2023; Casati et al., 2023; Thi et al., 2023) health infrastructure, transportation facilities (Fidella 2021) financial market (Yolanda 2017). Sasmaz et al., 2020 explored the positive effects of renewable energy on HDI in the case of 28 OECD countries. Githaiga & Kilong (2023) sight at how institutional quality affects how foreign investment flows and the human capital's growth interact in SSA. Their findings showed a beneficial connection between remittances, FDI, as well as the quality of institutions with the growth of human capital.

The present study used institutional quality as an estimator of HDI. The institutional quality differences worldwide caused considerable variations in productivity growth, capital accumulation, and educational attainment (Uddin et al., 2023). It has been claimed that the politicization of energy is a result of rising energy demand, particularly in emerging economies, which is driven by economic growth. As a result, the price goes up, which motivates the government to subsidize it to promote openness and affordability, particularly for the deprived society. In the present study, we look at how the political system and electricity access affect the HDI.

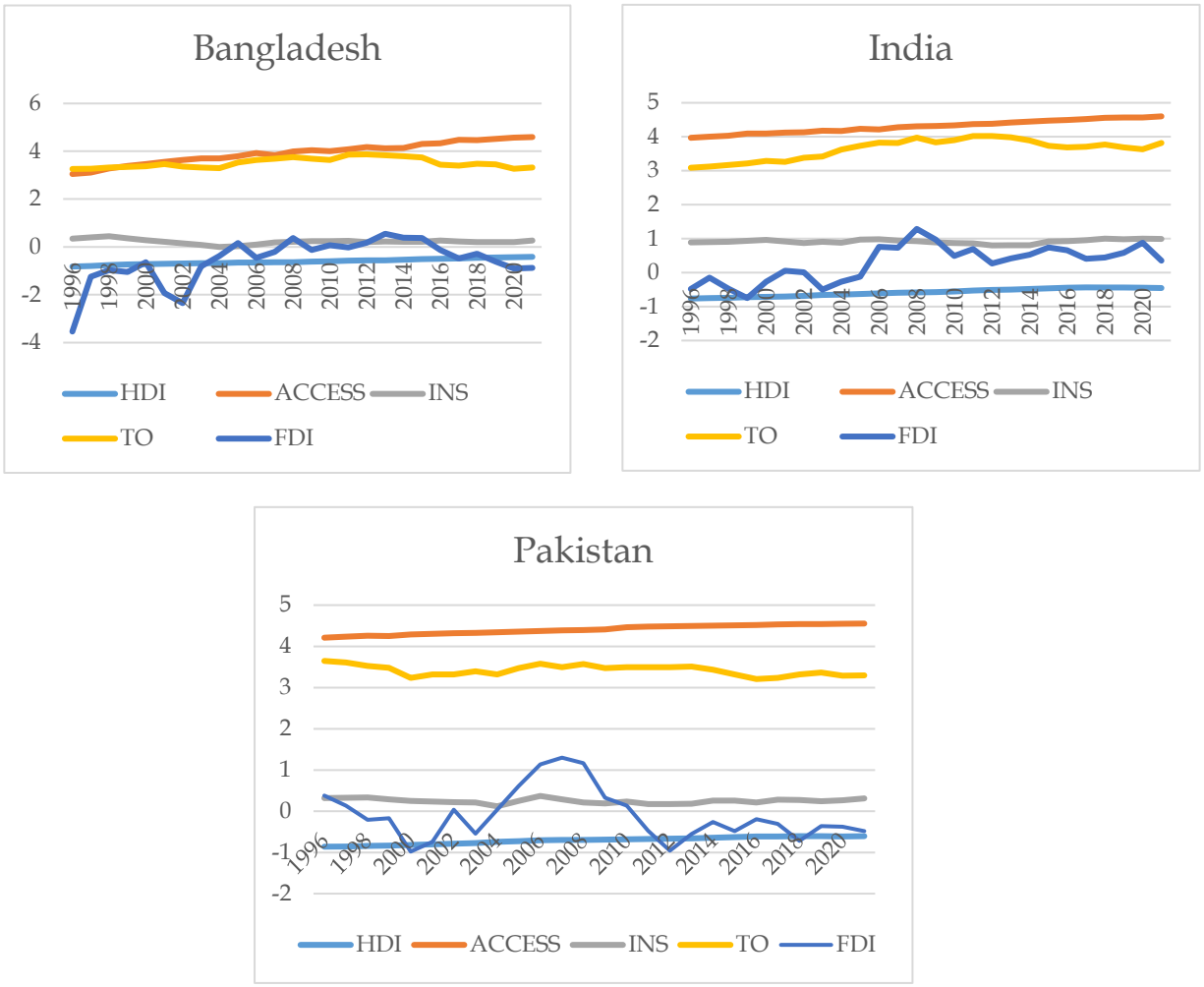

Figure 2
Statistics of India, Bangladesh, & Pakistan

Some studies found that corruption and violence reduce human development (Alves et al., 2017), regulatory quality, government effectiveness, and the rule of law improve human development (Keser & Gökmen 2005), political stability increases human development (Kadir et al., 2022) institutional quality raise the human development (Kamalu & Ibrahim 2022), and electricity accessibility improves productivity, health, education, and income (Bridge 2016; Olanrele et al., 2020). This study dives into the intricate interaction between electricity access, institutional quality, and human development, to shed light on the delicate connection between these critical aspects. This research tries to address gaps in the current literature by framing the analysis within the context of rising global concerns about sustainable development, emphasizing the possible electricity accessibility's impact jointly with the quality of institutions on human development.

Thus, this research objective is to explore the effect of electricity access as well as institutional quality on the human development index in Pakistan, Bangladesh, and India by using the data from 1996-2021. Past studies examined the relationship between HDI and electricity access in other regions but not in these countries. Moreover, this study used interaction terms of electricity access and institutional quality which is not being studied in previous literature. The remainder of this research is separated into the following parts: the literature reviews reported in part 2. Parts 3 and 4 show the technique and results, respectively. Part 5 provided the research's conclusion.

2 Literature reviews

A sustainable planet has to be able to access adulate energy sources. Achieving gender equality, eradicating poverty, improving health, and empowering communities to adapt to climate change can all be accomplished with widespread access to energy (Li et al., 2023, Murshed & Ozturk 2023, Casati et al., 2023, Jena & Tanti 2023). For economies to grow quickly and sustainably and to reduce poverty, infrastructural services, notably electricity, must be significantly expanded in terms of their availability, quality, and accessibility (Iwayemi 2008). Asghar et al., (2022) assessed whether having power accessibility aids in the reduction of poverty in emerging nations. In 82 developing nations, energy accessibility's effect on the overall residents, urban as well as rural residents, and deficiency studied during 1990-2020. The findings demonstrate an inverted U-formed association between poverty and power accessibility in urban as well as rural individuals as a whole.

Researchers discuss the association between power accessibility, and human and economic development (Suryanto et al., 2023; Sarkodie & Adams 2023; Nipo et al., 2023). As an assessment of human well-being, Ouedraogo 2013, examines the interconnection between electricity consumption and HDI in fifteen emerging nations from 1988 to 2008. In the short term, the empirical findings were consistent with the neutrality theory. Ahmad et al., (2014) calculated the outcome of electricity availability as well as access on two features of human well-being, namely educational and health status. It discovered a substantial link between electricity accessibility and household security in both city and rural areas.

Over the above-mentioned economic indicators, electricity access has a strong impact on the remaining two factors of HDI like education and health (Squires 2015; Matinga & Annegarn 2013; Olanrele et al., 2020). Moreover, Bridge et al., (2016), observed the effect of electricity in the case of Nepal's income, literacy, mortality, and labor efficiency. The researchers used Nepal Living Standards Survey-III, 2010–2011 data. This study discovers that having electricity accessibility contains a very big as well as considerable impact on household income, level of education, and agricultural output. Furthermore, recent electricity moods reduce well-being risks from internal air pollution produced by the use of unsafe, costly fuels like timber, coal, and paraffin, which also marks better illumination that can assist education from a social viewpoint (Ahmad et al., 2014; Olanrele et al., 2020; Opoku et al., 2020).

In addition to electricity access, institutional quality can also play a vital role in human welfare. "Institutional quality" refers to how effectively a government conducts the allocation of resources to satisfy particular demands, the maintenance of law and order, and the collecting of taxes (Aloui 2019). Some research extends to investigate the effect of institutional quality on human development. As Thi et al., (2023) concluded from a study emerging economies with great governance value see an FDI has a stronger effect on HDI than in different nations, high-quality governance is vital for advancing human growth. In Pakistan, Ullah & Majeed, (2023) the institutional quality (IQ) on human development (HD) as well as multifaceted poverty at the district scale was examined. The results demonstrated that IQ improves HD and reduces poverty at the district level.

Moreover, Stryzhak et al., (2022) also confirmed this relationship between institutional quality and HDI with data from 188 countries from 2017 to 2019. The study concluded that there is a direct and encouraging association between HDI and WDI.

A detailed analysis of the literature reveals that different research finds the effect of electricity accessibility as well as institutional quality on human development separately. This review's confirmation suggests that having access to electricity and high-quality institutions—such as those that support governance—improves health, income, and education. However, prior research has a gap and has not examined the impact of institutional quality and electricity access, jointly on human development Thus, the current research is novel to examine the impact of access to electricity

combined with institutional quality on human development in South Asia. To fill the gap, the present study takes a period from 1996-2021.

As far as the estimation of institutional quality is concerned, different studies used different proxies like the Rule of Law, quality of contract enforcement, and property rights (Alonso & Garcimartín 2013) Country Policy, and Institutional Assessment (Githaiga& Kilong 2023). The present study used "Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption". This research filled the literature gap in dimensions. Firstly, the present study discovered the connection between electricity access, institutional quality, and HDI in three Asian countries Pakistan, Bangladesh, and India. Past studies examined the connection between human development and electricity access in other regions. Secondly, no previous study explored this relationship by using the interaction of institutional quality and electricity access. The visual representation of summarizing the literature review is presented below.

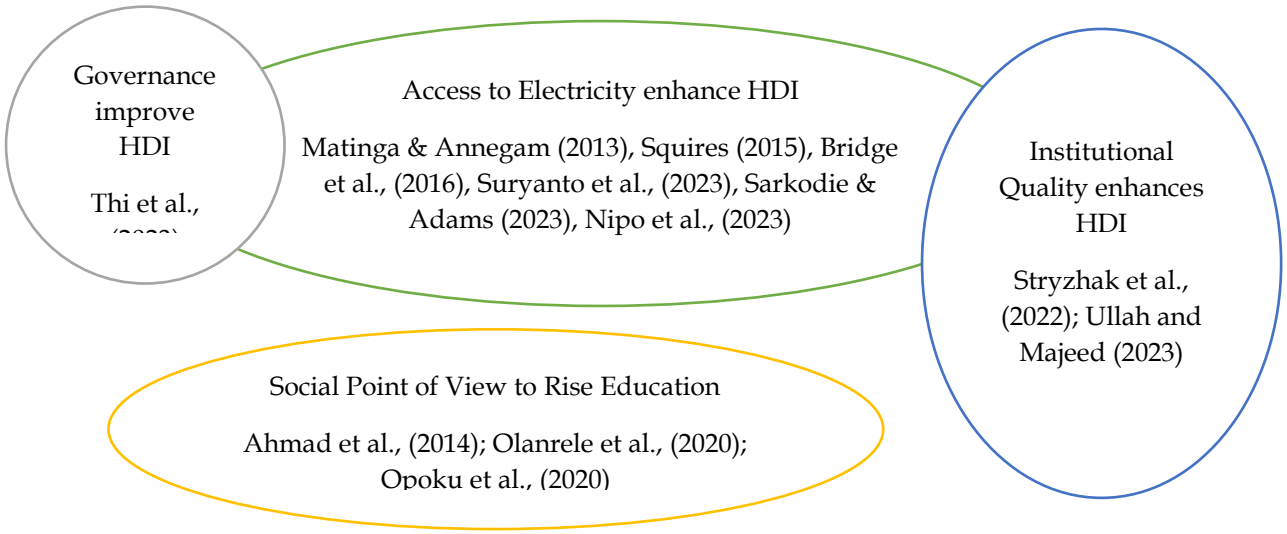

Figure 3
Summary of Literature Review

2.1 Theoretical Background

The current study is based on the neutrality theory, Ouedraogo (2013) used this theory to determine the effect of energy consumption on human development. According to this theory, improvements to infrastructures including access to electricity, can be impartial or free of bias effects on the broader socioeconomic system. Neutrality theory could be used to investigate how the availability of electricity, as a basic infrastructure element, may not intrinsically benefit one sector of the populace over another, leading to improved human development effects. This theoretical framework enables an examination of how, when stipulated neutrally as well as equality, access to electricity may provide an equitable environment, allowing greater accessibility to healthcare, schooling, and work opportunities, thereby promoting human development across the targeted number of people. The present research digs at the vital relationship between electricity accessibility and human development in the context of South Asia's efforts to achieve the Sustainable Development Goals (SDGs) as well as regional growth goals. This study, which is an integral component of regional development efforts of South Asia, assists in the accomplishment of SDG 7 ("Affordable and Clean Energy") as well as SDG 1 ("No Poverty") by underlining the important role of electricity access in raising quality of life along with stimulating economic development. The outcomes of the present research correlate to the regional aim of fostering sustainable development in South Asia by addressing the critical demand for viable energy options. In addition, the study emphasizes the

crucial significance of focusing on access to electricity as an incentive to better healthcare, schooling, and as a whole social and economic wellness, promoting aimed legislative actions that may bring about beneficial improvements in the region's human development. Figure 4 depicts the conceptual outline of the current study.

Hypothesis 1: Access to electricity has a positive impact on human development.

Hypothesis 2: Institutional quality has a positive impact on human development.

Hypothesis 3: Access to electricity with the interaction term "institutional quality" has a positive impact on human development.

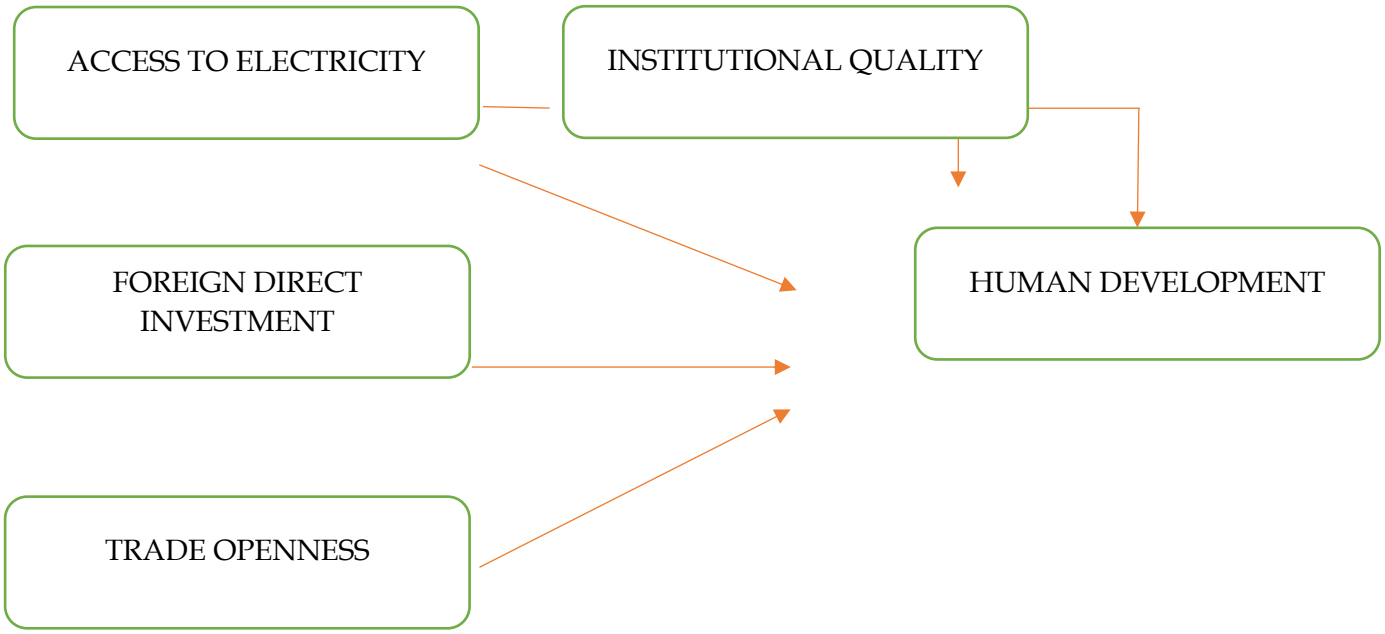

Figure 4
Conceptual Framework

3 Methodology

To select the appropriate estimation econometric methodology for estimating the coefficients in the panel model, the Driscoll and Kraay (D-K) model approach is applied because of the pre-estimation diagnostic tests. Because of the concerns of cross-section dependency and heteroscedasticity in the panel model, the D-K approach was used to empirically assess the panel model. Haruna & Abu Bakar (2021) used the D-K model for analysis because of the existence of cross-section dependency as well as heteroscedasticity in the panel model. The Driscoll-Kraay approach is resistant to serial correlation, heteroscedasticity, as well as cross-sectional dependency (Driscoll & Kraay 1998). This study utilized the D-K regression model using pooled OLS which was developed by Hoechle (2007). The research runs three models of South Asia countries from 1996 to 2021 for analysis and the model equations for identifying the relationship are as follows:

$$HDI_{it} = \delta_o + \gamma + \delta_1 ACCESS_{it} + \delta_2 TO_{it} + \delta_3 FDI_{it} + \varepsilon_{it} \quad (1)$$

$$HDI_{it} = \delta_o + \gamma + \delta_1 ACCESS_{it} + \delta_2 INS_{it} + \delta_3 TO_{it} + \delta_4 FDI_{it} + \varepsilon_{it} \quad (2)$$

$$HDI_{it} = \delta_o + \gamma + \delta_1 ACCESS_{it} + \delta_2 INS_{it} + \delta_3 ACCESS * INS_{it} + \delta_4 TO_{it} + \delta_5 FDI_{it} + \varepsilon_{it} \quad (3)$$

Here HDI stands for human development index, ACCESS represents access to electricity, INS represents institutional quality, (ACCESS*INS) represents the interaction effect between admittance to electricity and institutional quality, TO is used f trade openness and FDI characterizes foreign direct investment. i, t, γ,, and Ɛ represent the country, time, time effect, and error term, respectively. Table 1 details the variables, time span, and sources.

Table 1

Variables and Sources

Variable	Symbol	Proxy	Period	Source
Human Development Index	HDI	HDI by life expectancy, expected and mean year of schooling, GNI	1996-2021	UNDP
Access to Electricity	ACCESS	Access to electricity (% of population)	1996-2021	WDI
Institutional Quality	INS	Index calculation based on 6 indicators		
Indicators of Institutional Quality				
Control of Corruption		Percentile Rank	1996-2021	WDI
Government Effectiveness		Percentile Rank	1996-2021	WDI
Political Stability and Absence of Violence/Terrorism		Percentile Rank	1996-2021	WDI
Regulatory Quality		Percentile Rank	1996-2021	WDI
Rule of Law		Percentile Rank	1996-2021	WDI
Voice and Accountability		Percentile Rank	1996-2021	WDI
Control Variables			1996-2021	WDI
Trade Openness	TO	Trade (% of GDP)		
Foreign Direct Investment	FDI	Foreign Direct Investment, Net Inflow (% of GDP)	1996-2021	WDI

4 Results

The response variable is HDI, the main repressor is ACCESS, the interaction term is INS, and the control variables are TO and FDI. Table 2 gives a detailed descriptive analysis of all study variables. The finding proved that HDI, INS, ACCESS*INNS, and TO are positively skewed while ACCESS and FDI are skewed leftward. ACCESS, ACCESS*INS, and FDI present leptokurtic behavior because their kurtosis values are less than 3 while HDI, INS, and TO present platykurtic behavior because of their kurtosis values greater than 3. Thus, each variable in the models is normally distributed due to the findings of skewness and kurtosis. The values of Jarque-Bera's probability also verify the findings. The in-depth details of the descriptive analysis are shown in the below table including the lowest values, highest values, standard deviation, mean and median, etc.

Table 2

Descriptive Statistics

	HDI	ACCESS	INS	ACCESS*INS	TO	FDI
Mean	-0.632347	4.215238	0.462764	-6.26E-16	3.524653	-0.130674
Median	-0.640555	4.310980	0.277818	-0.798914	3.486143	-0.139497
Maximum	-0.414001	4.600886	1.000000	14.94215	4.021661	1.299735
Minimum	-0.860383	3.051374	0.000000	-11.21637	3.087832	-3.535817
Std. Dev.	0.118724	0.350766	0.330556	5.510273	0.235910	0.783532
Skewness	0.101542	-1.481079	0.605526	0.732223	0.332785	-1.204281
Kurtosis	2.176649	4.895791	1.595908	3.536525	2.118039	6.801926
Jarque-Bera	2.337239	40.19730	11.17389	7.905509	3.967720	65.83140
Probability	0.310796	0.000000	0.003746	0.019202	0.137537	0.000000
Sum	-49.32307	328.7886	36.09556	-7.86E-14	274.9229	-10.19255
Sum Sq. Dev.	1.085343	9.473827	8.413604	2337.959	4.285309	47.27199
Observations	78	78	78	78	78	78

Source: *Author's Calculations through E-Views 10*

Breusch-Pagan Lagrange Multiplier, Pesaran scaled Lagrange Multiplier, as well as Pesaran CD probability values indicate cross-section dependency (CSD) between nations in the panel. Thus, it rejects the null hypothesis, which states no CSD exists. Table 3 shows the detailed findings of the CSD test.

Table 3

Cross-Section Dependency Test

Test	Statistic	d.f.	Probability
Breusch-Pagan LM	13.55992	3	0.0036
Pesaran scaled LM	4.311068		0.0000
Pesaran CD	3.240759		0.0012

Source: *Author's Calculations through E-Views 10*

Given the presence of cross-section dependency, the second-generation unit root test is adequate for determining variable stationarity. The current study applies the Cross-Sectional Augmented Im-Pesaran-Shin (CIPS) unit root test to demonstrate that the results are I(0) and I(1) mixed. INS and FDI are stationary at level, although HDI, ACCESS, ACCESS*INS, and TO are stationary after taking the first difference. Table 4 has a thorough explanation of the stationary test.

Table 4

Unit Root Test (Second Generation Unit Root, CIPS)

CIPS			**Conclusion**
Variables	**At Level**	**At 1st Difference**	
HDI	-0.370	-2.657***	I (1)
ACCESS	-1.844	-5.712***	I (1)
INS	-2.829***		I (0)
ACCESS*INS	-0.134	-4.722***	I (1)
TO	-1.802	-5.202***	I (1)
FDI	-3.311***		I (0)

Source: Author's Calculations through STATA 14

The cointegration test discards the null hypothesis which states "no cointegration" between variables. The probability value of panel v-statistics and panel ADF-statistics proves long-run relation exists. Table 5 has a detailed description of the cointegration test.

Table No 05

Pedroni Residual Cointegration Test

	Statistic	**Prob.**	**Weighted Statistic**	**Prob.**
Panel v-Statistic	1.418327	0.0780	1.478382	0.0697
Panel ADF-Statistic	-1.646588	0.0498	-1.794371	0.0364
Panel rho-Statistic	0.253958	0.6002	0.152210	0.5605
Panel PP-Statistic	-0.838403	0.2009	-1.109082	0.1337

Source: *Author's Calculations through E-Views 10*

The Wooldridge test was employed to assess autocorrelation in the current study, while the Wald test was utilized to assess heteroscedasticity in the panel model. The results showed that the model lacks autocorrelation but does exhibit heteroscedasticity. The detailed findings of both tests are given in Table 6.

Table 6

Wooldridge Test and Wald Test

Test Statistics	**Value**	**Test Statistics**	**Value**	**d.f.**	**Prob.**
F(1, 2)	11.378	F-statistics	14.42421	(4, 73)	0.0000
Prob > F	0.0778	Chi-square	57.69685	4	0.0000

Source: *Author's Calculations through E-Views 10 and STATA 14*

The VIF results proved no multicollinearity among variables. Table 7 presents a full description of VIF results.

Table 7

Variance inflation factor

	VIF	1/VIF
FDI	1.694	0.590
TO	1.59	0.629
INS	1.189	0.841
ACCESS	1.105	0.905
Mean VIF	1.395	

Source: *Author's Calculations through E-Views 10 and STATA 14*

The Driscoll-Kraay model is used because the panel model has CSD as well as heteroscedasticity. In the long run, electricity accessibility has optimistically and significantly impacted the human development index (HDI) in South Asian countries in all models. It means that a 1% rise in electricity accessibility caused a 0.175%, 0.176%, and 0.187% increase in the HDI in Models 1, 2, and 3, respectively. The current finding is similar to the result of Olanrele et al., (2020) which proves that in Nigeria's rural communities, electricity access enhances the level of education as well as health. Access to electricity surges the productivity of industries and factories, creating greater job opportunities. This, in turn, reduces income disparity and leads to higher levels of human development. In Models 2 and 3, institutional quality has a long-term optimistic and major impact on the human development index. It indicates that a 1 percent rise in institutional quality raises the HDI by 0.050% and 0.063% in Model 2 and 3, respectively in South Asian countries. This finding is consistent with Kamal & Ibrahim (2022) which states that the quality of institutions improved HDI in fourteen developing nations from 1991 to 2019 which did not include Bangladesh, India, and Pakistan. Improvements in institutional quality benefit both the social and political systems, which boosts economic growth and leads to greater human development. In Model 3, access to electricity, when combined with the interaction term "institutional quality" (ACCESS*INS), has long-term positively as well as significantly impacted the HDI. It means that a 1 percent rise in ACCESS*INS results in a 0.006% gain in the HDI in South Asian countries. Because the combined impact of electricity accessibility and the quality of institutions on HDI is novel, no one has measured it, hence there is no precedent for this outcome. Access to electricity combined with high-quality institutions has a synergistic effect on human growth. Both at the same time led to economic development, social development, improved health systems, poverty reduction, and other benefits that raise human development levels more effectively and swiftly. The control variables also have a significant impact on the HDI. Trade openness has a positive impact on the human development index, whereas foreign direct investment has a negative impact. It means that a 1 percent rise in trade openness raises the HDI by 0.257%, 0.246%, and 0.166% in Models 1, 2, and 3, respectively in the long run. Trade openness promotes economic growth, job creation, income disparity reduction, and access to goods and services. This, in turn, provides health care and raises living standards, leading to a rise in HDI. Furthermore, a 1 percent rise in foreign direct investment reduces the HDI by 0.037%, 0.042%, and 0.039% in Models 1, 2, and 3, respectively. This finding is consistent with Nam & Ryu (2023) research, which shows that FDI does not increase human development as assessed by health, schooling, as well as income, rather effective governance manages FDI ethically and safeguards against harmful FDI, hence enhancing human development. FDI degrades the environment, affecting human health and, as a result, lowering the level of human development. Table 8 has a thorough description of the Driscoll-Kraay Models.

Table 8

Driscoll-Kraay Model by Pooled OLS

(Maximum 2 Lags selected automatically in all models)

Dependent Variable: HDI			
Variables	**Model 1**	**Model 2**	**Model 3**
ACCESS	0.175	0.176	0.187
	(0.012**)	(0.012**)	(0.003***)
INS	-	0.050	0.063
		(0.025**)	(0.024**)
ACCESS*INS	-	-	0.006
			(0.000***)
TO	0.257	0.246	0.166
	(0.000***)	(0.000***)	(0.000***)
FDI	-0.037	-0.042	-0.039
	(0.089*)	(0.052*)	(0.059*)
C	-2.281	-2.273	-2.041
	(0.000***)	(0.000***)	(0.000***)
Prob>F	0.000	0.000	0.000
R-square	0.425	0.442	0.501
Root MSE	0.092	0.091	0.087

Note: **, **, *** represents the 10%, 5%, and 1% significance level*

5 Conclusion

The current research aims to identify the impression of access to electricity with institutional quality on human development in South Asian countries. The data utilized for analysis was from 1996 to 2021. This research employed the Driscoll-Kraay (D-K) approach because of the presence of cross-sectional dependency as well as heteroscedasticity. The variables have mixed stationary results and the cointegration test showed cointegration exists between variables. This research runs 3 models for analysis and the results are the same in all models. The main findings of this research showed that access to electricity, when integrated with institutional quality (ACCESS*INS), has long-term positively and significantly impacted the HDI. It demonstrates that a 1% increase in ACCESS*INS corresponds to a 0.006% boost to the human development index in South Asian countries. Access to electricity, when paired with high-quality institutions, has a beneficial influence on the development of humans. Both resulted in social and economic growth, improved health systems, decreased poverty, and numerous other improvements that raised human development levels more efficiently and quickly. Thus, governments may encourage human growth by boosting electricity access along with strengthening the quality of institutions.

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