Effects of Renewable Energy Adoption on Public Health Outcomes in Nigeria's South-South Region

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Abstract
The worldwide transition to renewable energy is crucial for tackling environmental deterioration, climate change, and health issues related to reliance on fossil fuels. This research focused on the influence of renewable energy on public health and examined perceptions, possibilities, and obstacles concerning the energy shift in Nigeria's South-South area. A mixed-methods approach was employed, involving 400 questionnaire participants and 60 interviewees chosen from six states in the region. The analysis of data included descriptive statistics, weighted means, chi-square assessments, and one-sample t-tests. The results showed that participants largely view renewable energy as significantly beneficial for public health (grand mean = 3.68). Renewable energy was linked to decreased air pollution, fewer respiratory diseases, enhanced indoor air quality, and reduced hospital admissions related to fossil fuel emissions. The one-sample t-test indicated a statistically significant positive influence of renewable energy on public health ($t = 30.91$, $p < 0.05$), which led to the dismissal of the null hypothesis. Nonetheless, concerns emerged about the environmental and health impacts of specific technologies, including wind energy and small-scale hydropower systems. Furthermore, the findings highlighted a strong awareness of the region's renewable energy capabilities (Decision Index = 2.67), especially regarding solar and biomass resources, along with a moderate endorsement for the local manufacturing of renewable energy technologies. Despite this potential, uptake is notably low due to insufficient government support, weak policy enforcement, inadequate infrastructure, and limited funding options. The chi-square analysis revealed no significant differences in how respondents viewed key aspects of the energy transition ($\chi^2 = 10.22$, $p > 0.05$), suggesting a common understanding of energy challenges in the area.The study concludes that renewable energy can provide considerable public health advantages and possesses significant developmental possibilities in Southern Nigeria; however, effective implementation faces limitations stemming from institutional and structural deficiencies. It advises enhanced policy frameworks, increased investment in renewable infrastructure, and improved public education to facilitate a sustainable energy transition in the region.

Keywords: *Renewable, Energy, Adoption, Public, Health & Outcomes*

1.0 Introduction

The transformation of energy systems and advancements in green innovation have emerged as promising solutions for mitigating the environmental effects associated with fossil fuel energy on a global scale (Gera et al., 2024). The urgent global initiative to transition from fossil fuel-based energy to renewable resources is found on the acknowledgment of the ecological damage inflicted by fossil fuels (Soubhari et al., 2025). Both developed nations and those in the process of developing are currently emphasizing green innovations to lessen the levels of emissions produced by the industrial sector; however, funding for clean energy in developing nations remains inadequate. The tension between climate change policies and political dynamics has been identified as one of the significant barriers to achieving sustainable development worldwide (Soubhari et al., 2025). Sustainable Development Goal 12 focuses on responsible consumption and production and outlines specific goals aimed at ensuring optimal resource utilization, enhancing energy efficiency, creating environmentally friendly and decent job opportunities, promoting cleaner energy use, reducing emissions from production processes, and ultimately improving overall life quality. SDG 12 emphasizes the critical need to cut emissions before the year 2030. The long-term objective is to attain a net-zero global carbon footprint by the year 2050. Hou and Waqas (2024) contend that reliance on fossil fuel energy should belong to the past; however, evidence indicates a lack of adherence to the Paris Agreement and other international accords aimed at reducing manufacturing emissions. Ghaleb and Menyhart (2023) suggested that the worldwide energy transition is driven by a combination of advancement and public awareness. The belief that renewable energy is completely clean has sparked scholarly research in the field. According to Ghaleb and Menyhart (2023), renewable energy transition refers to the integration of clean energy sources into the foundational systems, which include power distribution networks, transportation infrastructures, and systems for heating and cooling. Ivanova and Palto (2023) employed a blend of pragmatic epistemology along with an exploratory, inductive approach for their research. Examining the United Kingdom as a case study to analyze the effects of renewable energy, their findings revealed that participants voiced concerns regarding climate change and possessed a strong understanding of the positive impacts of renewable energy sources on the environment, especially in relation to pollution reduction, global warming abatement, and addressing climate change challenges. Despite this, many participants remained doubtful about the widespread assumption that renewable energy is completely safe. The primary motivation for the growing demands for a shift away from non-renewable energy resources stems from the goal of alleviating their adverse environmental effects (Ivanova & Palto, 2023). Renewable energy sources, often labeled as clean energy, are obtained from resources that naturally replenish themselves. These energy sources are sustainable and exist in nature, allowing for limitless extraction (Rada, 2017). Ivanova and Palto (2023) assert that the environmental repercussions of fossil fuel usage have not been accurately assessed, while Rada (2017) noted that some of the most severe consequences linked to non-renewable energy sources include climate change, global warming, rising sea levels, and the melting of polar ice caps. Arshad and Abbas (2017) reported on the public health implications associated with non-renewable energy usage.

Bardi (2019) emphasizes the importance for each nation to assess its own energy resource base and the available technologies that ensure social fairness, commercial practicality, and minimal environmental degradation. This viewpoint stems from the insufficient dedication to the worldwide initiatives aimed at enhancing the planet's health through various treaties and agreements. Rada (2017) highlights that African nations contribute only a meager 3% to the global carbon emissions, yet they appear to be more susceptible to the consequences of climate change.

Consequently, there has been discussion regarding whether embracing renewable energy can tackle the cross-border dispersal of air pollutants on a global scale. Although this theory is still under discussion within academic circles, it has been suggested that a shift to cleaner energy may not completely remove localized exposure to risks. Production of crude oil worldwide has reached its peak and is set to decline, indicating a reduction in crude oil reserves (Bardi, 2019). Nigeria relies significantly on fossil fuels for its commercial, agricultural, industrial, and transport sectors, yet the nation is committed to numerous local and international initiatives aimed at transitioning to cleaner energy sources. Reports indicate that local circumstances favor the utilization of wind, solar, biomass, and geothermal energy; however, financial investments required to facilitate the availability of clean energy remain insufficient. The southern region of Nigeria has been shown to have the potential to harness solar energy, with Ali (2022) suggesting that solar power offers significant opportunities for rural communities as a solution to the inadequate energy supply from the national grid. Hence, this research aimed to analyze the pathway of energy transition in southern Nigeria. The study intends to assess the renewable energy possibilities in the area along with the present utility rates.

2.0 Literature Review

The study is theoretically grounded in the sustainable development theory and the environmental Kuznets curve hypothesis, focusing particularly on the impact of technological advancements, economic progress, and environmental management during the energy transition (Godil et al, 2021). Sustainable Development Theory serves as a comprehensive theoretical base as it asserts that economic advancement should not compromise the environmental resources that future generations will need (Anser, et al, 2021). When applied to the energy sector, this theory advocates for establishing an energy framework that merges economic efficiency, social accessibility, and ecological sustainability. This theory proves especially valuable in analyzing the shift from fossil fuels to renewable energy sources in Nigeria. The nation's reliance on oil and gas yields substantial economic gains yet simultaneously exerts environmental strain due to carbon emissions, gas flaring, and damage to ecosystems (Anser, et al, 2021). Consequently, sustainable development necessitates that Nigeria optimizes its current energy assets while incrementally enhancing investment in cleaner and renewable energy innovations. The environmental Kuznets curve hypothesis enhances Sustainable Development Theory by illustrating how environmental harm can evolve alongside economic growth (Arasu et al, 2021). In the initial phases of development, the processes of industrialization, urbanization, and rising energy use may lead to increased pollution levels. Nevertheless, as incomes rise and societies develop improved technological and institutional capabilities, they may shift towards cleaner technologies, renewable energy, and more rigorous environmental regulations. Thus, the theory aids in exploring whether Nigeria's economic growth and growing energy requirements can ultimately separate from environmental harm through technological progress and energy diversification.

Moriarty and Honnery (2022) identify key elements in this context as energy transition, renewable energy sources, solar power, hydroelectric energy, biomass energy, and wind energy. Energy transition signifies the shift from one predominant energy system to another. Throughout history, human cultures have transitioned from biomass to coal, and later from coal to oil and natural gas. The current transition is primarily fueled by worries regarding climate change, greenhouse gas emissions, energy security, and the necessity for sustainable economic growth (Moriarty & Honnery, 2022). Additionally, solar energy stands out as a crucial renewable energy source because sunlight is abundantly available and can be transformed into electricity via photovoltaic

technology. This form of energy holds significant importance for Nigeria due to the nation's favorable solar radiation conditions and ongoing limitations in conventional electricity supply. However, ensuring the sustainability of solar energy also requires consideration of the production, longevity, recycling, and disposal of photovoltaic panels and other related components.

Hydroelectric power produces electricity by harnessing the potential and kinetic energy of flowing or stored water, subsequently converting it to mechanical and then electrical energy. Hydropower is a well-established renewable energy technology that already plays a role in Nigeria's electricity supply. Its development can aid in diversifying energy sources, although factors such as environmental ramifications, displacement, seasonal water supply, and infrastructure expenses need careful evaluation. Biomass energy refers to the use of organic materials, including wood, agricultural waste, and other biological substances, to produce energy. While biomass is often considered renewable, its sustainability relies on the methods of resource extraction and management. Unsustainable logging practices can diminish the ability to sequester carbon, lead to deforestation, and create environmental pressures (Bush, 2019). Therefore, biomass needs to be assessed based on its overall environmental and carbon impact instead of being automatically classified as a clean energy source. In another context, wind energy is produced by transforming the kinetic energy of air movement into mechanical or electrical energy using wind turbines. Wind power presents a significant opportunity to diversify electricity production since wind is naturally replenished and does not involve fuel combustion during energy generation. The viability of wind energy is influenced by factors such as wind velocity, consistency, geographical features, infrastructure, grid integration, and the expenses associated with installation and upkeep. Consequently, in Nigeria, evaluating wind resources is essential to identify sites where wind energy can substantially support the national energy transition (Belyakov, 2019). The idea of a circular economy further enhances the development of renewable energy by focusing on the efficient utilization of resources, their reuse, recycling, recovery, and minimizing waste. Within the framework of energy transition, adopting a circular model necessitates analyzing not only the emissions prevented by renewable technologies but also the materials involved in their creation, their operational lifetime, and the management of waste produced at the end of their life cycle. Thus, achieving a sustainable energy transition demands a comprehensive strategy that integrates the deployment of renewable energy, technological advancements, resource efficiency, environmental stewardship, and effective waste management.

Research has primarily highlighted obstacles to a successful energy transition and the necessity for a varied energy portfolio. Moriarty and Honnery (2022) pointed out that excessive optimism about solar and wind power represents a significant limitation, claiming that their unpredictable nature and variability are frequently overlooked. This oversight has resulted in undervaluing alternative low-carbon solutions, such as nuclear energy, which is known for its reliability. Dai et al. (2022) further corroborated this disparity in energy policy choices. Moreover, the sluggishness in regulation and ineffective policy application has obstructed the uptake of low-carbon technologies (Belyakov, 2019). Bush (2019) noted that geothermal energy is not fully exploited in developing nations due to insufficient funding and a lack of local technology. In support of this, Rada (2017) clarified that geothermal energy, which originates from the heat stored beneath the earth's surface, holds considerable possibilities but necessitates technological improvement for optimal use. Collectively, these research findings indicate that a successful transition to sustainable energy relies not only on innovation in technology but also on well-rounded policy strategies and investment in a range of energy options.

3. Methodology

The target population encompassed individuals from the six South-South states of Nigeria, which are Akwa Ibom, Bayelsa, Cross River, Delta, Edo, and Rivers. According to the 2006 National Population Census, the total population of this region was 20,997,655. Utilizing the Taro Yamane formula for sample size calculation with a 5% error margin, a sample of 400 respondents was determined for the distribution of questionnaires. Additionally, 60 individuals, consisting of 10 respondents from each state, were chosen for interviews. The sample for the questionnaire was allocated across the six states proportionately based on their estimated population and household demographics. This allocation resulted in 74 respondents from Akwa Ibom, 32 from Bayelsa, 55 from Cross River, 78 from Delta, 61 from Edo, and 99 from Rivers State. A multistage sampling method was utilized. Initially, the six states forming the South-South geopolitical area were identified as research sites. Following this, the sample was proportionately distributed among the states, and respondents were chosen through random sampling. Eligible participants included adult members of households, especially heads or representatives, who were proficient in English and had access to alternative energy options, notably solar energy. Interview subjects were intentionally selected based on their understanding or engagement in energy-related policies and practices. Quantitative data analysis employed both descriptive and inferential statistical methods. Descriptive statistics, such as frequencies, percentages, means, and suitable graphical representations, summarized the socio-demographic traits of respondents and their perspectives on energy transition. Qualitative insights gained from interviews and observations were systematically coded and thematically analyzed using content analysis. This examination concentrated on repeated themes, viewpoints, experiences, and key concepts associated with the adoption of renewable energy, energy transition, and environmental consequences

4.0 Results

Objective One: To determine the impact of renewable energy sources on public health in the study area

Table 4.1: **Descriptive statistics of the impact of renewable energy sources on public health in the study area**

S/N	Items	SA (n/%)	A(n/%)	D(n/%)	SD(f/%)	U(f/%)	WM	Decision
1	The use of renewable energy reduces air pollution and respiratory illnesses.	179 (45.0)	139 (34.9)	33 (8.3)	26 (6.5)	21 (5.3)	**4.08**	Agree
2	Biomass burning still poses health risks through smoke inhalation.	166 (41.7)	146 (36.7)	47 (11.8)	20 (5.0)	19 (4.8)	**4.1**	Agree
3	Biogas technology improves sanitation and reduces disease from organic waste.	119 (29.9)	146 (36.7)	66 (16.6)	40 (10.1)	27 (6.8)	**3.73**	Agree
4	Solar energy systems promote cleaner indoor	186 (46.7)	119 (29.9)	46 (11.6)	27 (6.8)	20 (5.0)	**4.06**	Agree

	environments compared to kerosene or diesel.							
5	Poorly managed solar panels and batteries can release toxic substances.	113 (28.4)	133 (33.4)	80 (20.1)	40 (10.1)	32 (8.0)	**3.63**	Agree
6	Waste-to-energy projects reduce open dumping and associated vector-borne diseases.	100 (25.1)	139 (34.9)	80 (20.1)	46 (11.6)	33 (8.3)	**3.57**	Agree
7	Small hydropower development has minimal health implications for nearby communities.	80 (20.1)	100 (25.1)	93 (23.4)	80 (20.1)	45 (11.3)	**3.13**	Disagree
8	The shift to renewable energy reduces hospital visits linked to fossil fuel emissions.	146 (36.7)	133 (33.4)	53 (13.3)	40 (10.1)	26 (6.5)	**3.89**	Agree
9	Wind turbines, where available, produce low noise pollution and minimal health disturbances.	26 (6.5)	66 (16.6)	100 (25.1)	139 (34.9)	67 (16.8)	**2.63**	Disagree
10	Overall, renewable energy adoption improves public health and wellbeing in the region.	159 (40.0)	133 (33.4)	53 (13.3)	33 (8.3)	20 (5.0)	**3.95**	Agree
	Grand Mean						**3.68**	

The results displayed in Table 4.1 (Descriptive statistics of the influence of renewable energy sources on public health in the study location) indicates that participants largely view renewable energy as having a positive and significant effect on public health outcomes within the region. The detailed findings illustrate considerable consensus on the idea that renewable energy leads to decreased air pollution and respiratory diseases (WM = 4.08), fosters cleaner indoor conditions compared to energy derived from fossil fuels (WM = 4.06), and lowers hospital visits related to emissions from fossil fuels (WM = 3.89). Additionally, respondents concurred that biogas technology enhances sanitation and diminishes diseases resulting from organic waste (WM = 3.73), while waste-to-energy initiatives contribute to less open dumping and vector-borne diseases (WM = 3.57). Nonetheless, the results also depict certain apprehensions. Participants disagreed with the assertion that wind energy causes minimal health issues (WM = 2.63) and similarly showed disagreement regarding the minimal health consequences of developing small hydropower (WM = 3.13), implying perceived environmental or community-related risks tied to selected renewable technologies. The overall mean of 3.68 indicates that respondents' general sentiment exceeds the decision threshold of 3.00, signifying a shared viewpoint that renewable energy sources favorably affect public health in the examined area. Thus, it can be inferred that the

adoption of renewable energy is broadly recognized as advantageous to public health, even though there are specific concerns about technologies.

Objective Two: To assess and rank the perceptions of respondents regarding the acceptance of renewable energy through a system of decision indices.

Table 2: Rank Response on the Adoption and Use of Alternative Source of Energy in the Study Area

S/N	Interview Theme	Dominant Response	Frequency (%)	Decision Index (DI)	Interpretation	Rank
1	Development in energy sector	Slow and poorly developed	70.0	1.45	Poor development	8th
2	National energy transition agenda	Necessary but poorly implemented	80.0	1.90	Weak implementation	3rd
3	Renewable energy potential	High potential	75.0	2.67	Strong potential	1st
4	Local production of RE kits	Strongly support	60.0	2.50	High support	2nd
5	Government incentives	No incentive available	85.0	1.20	Very poor support	9th
6	Adoption level in state	Low adoption	70.0	1.40	Low adoption	7th
7	Environmental/health effects	Minimal negative effects	65.0	2.50	Generally safe	2nd
8	Impediments to transition	Policy & funding challenges	45.0	1.80	Structural barriers	4th
9	Feasibility of RE economy	Yes, gradually achievable	60.0	2.20	Moderately feasible	5th

Decision Rule: *DI ≥ 2.50 = High/Positive perception, DI = 2.00 – 2.49 = Moderate perception*
DI < 2.00 = Low/Negative perception

The results presented in Table 2 (Rank response on the adoption and use of alternative energy sources in the study region) highlights considerable differences in how respondents perceive the adoption, execution, and acceptance of renewable energy systems within the South-South area. The ranking assessment reveals that the potential for renewable energy in the region received the top rank (1st rank, DI = 2.67), signifying strong acknowledgment of the area's natural ability for renewable energy development. This is closely followed by the local production of renewable energy kits (2nd rank, DI = 2.50) and the perceived environmental and health safety of renewable energy systems (2nd rank, DI = 2.50), reflecting robust support for local manufacturing and perceived safety advantages. However, multiple structural deficiencies were noted. Government incentives earned a very low decision index (DI = 1.20, 9th rank), indicating inadequate policy backing for renewable energy development. Correspondingly, advancements in the energy sector were rated poorly (8th rank, DI = 1.45), while the level of adoption within the state was similarly low (7th rank, DI = 1.40), denoting weak implementation and limited spread of renewable technologies. Additionally, barriers to the transition of energy, such as inconsistent policies and

funding issues, received a ranking of 4th place (DI = 1.80), indicating that systemic obstacles significantly impede progress. Although respondents believe that transitioning to renewable energy is feasible in the long run (DI = 2.20), this feasibility is regarded as moderate rather than immediate. The findings indicate that while there is a robust acknowledgment of renewable energy potential and support for local production, the current adoption is hindered by poor policy execution, insufficient incentives, and infrastructural challenges.

H_{01}: Renewable energy does not have a statistically significant impact on public health in the study area ($\mu = 3.00$).

Table 3: One-Sample t-Test Analysis of the Public Health Impact of Renewable Energy in the Study Area

Source	N	Mean ($\bar{x}$)	μ	Std.	Std. EM	t-cal	df	t-crit (0.05)	Sig. (p-value)	RMK
Public Health Impact of Renewable Energy	398	3.68	3.00	0.44	0.022	30.91	397	1.96	0.000	Sig

Table 3 displays the findings from a one-sample t-test performed to assess if renewable energy significantly influences public health within the specified study area. The analysis reveals a sample mean ($\bar{x}$) of 3.68, exceeding the test value ($\mu = 3.00$), which suggests a generally favorable view of the health benefits associated with renewable energy. The calculated t-value amounts to 30.91, accompanied by 397 degrees of freedom, while the critical t-value at a significance level of 0.05 stands at 1.96. The p-value is recorded at 0.000, which is less than 0.05. This signifies that the difference identified between the sample mean and the test mean holds statistical significance. Given that the computed t-value (30.91) surpasses the critical value (1.96), alongside a p-value (0.000) that is below 0.05, the null hypothesis is thus denied. Consequently, it can be inferred that renewable energy significantly and positively affects public health in the study area. This implies that participants strongly believe that renewable energy lessens pollution, enhances environmental conditions, and boosts overall health.

H_{02}: There is no significant difference in respondents' perceptions across the key dimensions of energy transition in the South-South region of Nigeria.

Table 4: Multi-Item Chi-Square Test on Perceptions of Energy Transition in the South-South Region of Nigeria

Item			Observed (O)	Expected (E)	O−E	$(O-E)^2/E$
1	Development in energy sector	Slow and poorly developed	42	40.67	1.33	0.04
2	National energy transition agenda	Necessary but poorly implemented	48	40.67	7.33	1.32
3	Renewable energy potential	High potential	45	40.67	4.33	0.46

4	Local production of RE kits	Strongly support	36	40.67	-4.67	0.54
5	Government incentives	No incentive available	51	40.67	10.33	2.62
6	Adoption level in state	Low adoption	42	40.67	1.33	0.04
7	Environmental/health effects	Minimal negative effects	39	40.67	-1.67	0.07
8	Impediments to transition	Policy & funding challenges	27	40.67	-13.67	4.59
9	Feasibility of RE economy	Yes, gradually achievable	36	40.67	-4.67	0.54
	Total		**366**	**366** |		**χ^2 = 10.22**

Note: *df = 9 − 1 = 8, χ^2-critical (0.05) = 15.51, P-value ≈ 0.25: since 10.22 < 15.51 Fail to* reject H_0

Table 4 illustrates the results of the chi-square test aimed at determining if significant differences exist in how respondents perceive various aspects of energy transition in the South-South region. The chi-square evaluation yielded a calculated value of χ^2 = 10.22, with 8 degrees of freedom, while the critical value at a 0.05 significance level is established at 15.51. The p-value is roughly 0.25, exceeding 0.05. Given that the computed chi-square value is below the critical value, the findings suggest that the variations in perceptions among respondents across the nine thematic areas lack statistical significance. As χ^2-calculated (10.22) is lower than χ^2-critical (15.51) and because the p-value is greater than 0.05, the null hypothesis remains accepted. Therefore, it is concluded that there are no significant differences in how respondents perceive the key dimensions of energy transition in Nigeria's South-South region. This indicates that respondents largely hold similar opinions regarding the challenges, opportunities, and adoption patterns related to energy transition in the region.

Discussion of Findings

The data shown in Table 4.1 suggests that participants largely view renewable energy as having a beneficial impact on public health within the studied region. A mean score of 3.68 exceeds the threshold of 3.00, indicating that participants believe renewable energy helps to enhance health results, such as lessened air pollution, decreased respiratory issues, enhanced indoor air conditioning, and minimized contact with fossil fuel emissions. In particular, there is strong consensus that renewable energy mitigates air pollution and respiratory ailments (WM = 4.08), which correlates with established international data pointing towards fossil fuel burning as a significant source of particulate matter (PM2.5) exposure, closely associated with respiratory and heart diseases. This finding aligns with research by Lelieveld et al. (2015), revealing that pollution from fossil fuels poses a considerable health threat globally, resulting in millions of premature deaths each year. Additionally, the belief that solar energy enhances indoor air quality is corroborated by IEA (2021), which highlights that the shift from kerosene and diesel to cleaner energy reduces household air pollution exposure, especially in less developed areas. Nevertheless, participants raised concerns about wind energy (WM = 2.63) and small hydropower (WM = 3.13), indicating perceived environmental or community-level hazards. This corresponds with findings from Saidur et al. (2011), who recognized that while renewable technologies are cleaner, they still may introduce localized environmental and social issues based on location, infrastructure, and

community acceptance. The results indicate a general belief that renewable energy is advantageous for public health, in line with global research stressing its importance in decreasing health issues tied to reliance on fossil fuels. The corresponding hypothesis illustrated in table 4.2 for the one-sample t-test reveals a statistically significant positive view of renewable energy's influence on public health ($t = 30.91$, $p < 0.05$). The sample mean of 3.68 being substantially greater than the test mean of 3.00 reinforces that respondents regard renewable energy as advantageous for health outcomes. This observation is consistent with Markandya et al. (2018), who showed that a greater integration of renewable energy in Europe led to notable declines in deaths related to air pollution. It also aligns with Vohra et al. (2021), who calculated that pollutants from fossil fuels are responsible for over 8 million deaths each year, further underscoring the health advantages of transitioning to cleaner energy sources. Therefore, the statistical findings support the dismissal of H_{01}, affirming that renewable energy has a marked beneficial effect on public health in the studied area. The outcomes displayed in Table 4.2 indicate that participants significantly acknowledge the renewable energy capabilities of the South-South area (DI = 2.67), with a focus on solar, biomass, and hydropower assets. This is corroborated by REN21 (2023), which recognizes Nigeria as one of the most abundant countries in Africa regarding solar energy possibilities due to its elevated solar irradiance levels. Nevertheless, in spite of this promise, the actual embrace remains minimal (DI = 1.40), and the perception of governmental incentives is seen as insufficient (DI = 1.20). This corresponds with the findings of Amankwah-Amoah et al. (2021), who noted that the spread of renewable energy in Sub-Saharan Africa is obstructed by ineffective policy frameworks, inadequate financing systems, and systemic challenges. The observation that energy transformation is acknowledged as "essential but inadequately executed" further aligns with IRENA (2022), which highlights that despite numerous African nations having set renewable energy goals, there are ongoing gaps in execution due to infrastructural limitations and inconsistent adherence to policies. Additionally, the recognized significance of locally produced renewable energy equipment (DI = 2.50) corresponds with Bhattacharyya (2015), who asserts that developing local manufacturing capabilities is vital for a sustainable energy transition in emerging economies, as it lowers costs, enhances accessibility, and facilitates technology transfer. The results indicate an apparent contradiction: there is a high acknowledgment of potential while the readiness of institutions and infrastructure for a successful energy transition remains low. In a similar manner, the Chi-Square Test of Perceptions is presented in Table 4.4. The chi-square outcome ($\chi^2 = 10.22$, $p > 0.05$) reveals no substantial differences in the perceptions of respondents across various aspects of energy transition. This indicates a relatively consistent understanding among participants regarding energy transition matters like policy issues, levels of adoption, and renewable energy possibilities. This observation aligns with Akinbami et al. (2020), who found that the public perception of renewable energy in Nigeria tends to be uniform due to shared exposure to energy infrastructure difficulties and limited access to diverse energy solutions. Likewise, IRENA (2022) points out that in several developing countries, the public viewpoint on renewable energy is influenced by common structural limitations such as insufficient electricity provision, policy unpredictability, and a lack of awareness initiatives, resulting in a convergence of perspectives. Therefore, the null hypothesis (H_{02}) is upheld, suggesting that respondents broadly hold similar views on energy transition throughout the South-South region.

5.1 Conclusion

The research indicates that the incorporation of renewable energy has a notable and beneficial effect on community health in Nigeria's South-South area. This information implies that renewable

energy aids in decreasing air contamination, enhancing environmental conditions, and lowering health hazards related to the use of fossil fuels. Nevertheless, even though there is considerable awareness and acknowledgment of the potential benefits of renewable energy, its actual implementation is constrained due to insufficient policy backing, ineffective institutional structures, a lack of governmental incentives, and poor infrastructure. Additionally, the study reveals that participants display a relatively uniform viewpoint regarding the challenges and prospects of energy transition, suggesting a shared comprehension of the energy landscape in that region.

5.2 Recommendations

Considering the outcomes of the study, several recommendations are proposed and they include the fact that:

i. Both federal and state governments should create and implement more robust renewable energy policies, which may include providing subsidies, tax breaks, and financial programs that promote the involvement of the private sector in the development of renewable energy.

ii. There should be investments in renewable energy infrastructure including solar mini-grids, biomass energy systems, and hydropower plants. Furthermore, encouraging local production of renewable energy technologies can help lower costs and enhance accessibility.

iii. There is a pressing need for enhanced public education and awareness initiatives regarding the advantages of renewable energy, particularly its favorable effects on community health. Additionally, capacity-building programs should be established to cultivate the necessary technical skills for a sustainable energy transition in the area.

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