



ISSN: 2617-6548

URL: www.ijirss.com



Driving green: Examining organizational intent for renewable energy in Saudi Arabia

 Abdulaziz Alzahrani¹,  Abu Elnasr E. Sobaih^{1*}

¹Management Department, College of Business Administration, King Faisal University, Al-Ahsa 31982, Kingdom of Saudi Arabia.

Corresponding author: Abu Elnasr E. Sobaih (Email: asobaih@kfu.edu.sa)

Abstract

Due to cumulative pressure from climate change and the shift towards sustainable development, the transition to renewable energy has become more essential than ever. This study aims to explore the organizational intent to adopt renewable energy technologies in Saudi Arabia by integrating the Theory of Planned Behavior (TPB) and Resource-Based View (RBV) frameworks. A survey was conducted with 241 senior managers from various Saudi organizations and analyzed using SEM SmartPLS4. The results indicated that the three dimensions of TPB positively and significantly influence organizational intent to use renewable energy. Additionally, managers' green knowledge and awareness of renewable energy technologies significantly impact their attitudes and intentions to adopt renewable energy. The findings also revealed that government policies moderate the relationship between perceived behavioral control (PBC) and the intention to adopt renewable energy, as policies provide financial and technological support crucial for adoption. However, policies weaken the link between subjective norms or stakeholder pressure and intention. Furthermore, policies did not alter the effect of attitude on the intention to adopt renewable energy. Based on these results, several implications are proposed for policymakers and Saudi organizations to facilitate the successful adoption of renewable energy, aligning with Saudi Vision 2030 and its green initiatives. These include policy reforms to foster positive attitudes and social pressure among Saudi organizations to transition to renewable energy, as well as increasing awareness and knowledge among senior management regarding these technologies and their sustainable benefits.

Keywords: Governmental policy, green energy, knowledge, organizational intention, renewable energy, TPB.

DOI: 10.53894/ijirss.v8i5.8557

Funding: This work is supported by King Faisal University, Saudi Arabia (Grant number: KFU252218).

History: Received: 5 June 2025 / Revised: 9 July 2025 / Accepted: 11 July 2025 / Published: 16 July 2025

Copyright: © 2025 by the authors. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Competing Interests: The authors declare that they have no competing interests.

Authors' Contributions: All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.

Transparency: The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

Institutional Review Board Statement: The Ethical Committee of the Deanship of Scientific Research, King Faisal University, Saudi Arabia has granted approval for this study on 1 January 2025 (Ref. No. KFU252218).

Publisher: Innovative Research Publishing

1. Introduction

The global adoption of renewable energy demonstrates a substantial and continuous upward trajectory. This surge is primarily fueled by the increasing urgency of climate change mitigation, along with the improving economic competitiveness of renewable energy technologies [1, 2]. Hence, many organizations around the world have recognized the benefits of adopting renewable energy, such as solar photovoltaic (PV) and wind energy, into their business operations, particularly the reduction of operational costs, especially in the long term [3, 4]. There is international recognition of renewable energy adoption at an organizational level, reflecting a paradigm shift towards green energy [5-7]. The adoption of renewable energy may vary among large and small organizations, their locations, and sectors. There are several advantages for organizations to adopt renewable energy, such as cost reduction, enhanced energy independence, improved organizational image, and compliance with green regulations [5, 8]. Large organizations adopt power purchase agreements (PPAs) to safeguard their renewable energy needs as well as to confirm their commitment to sustainable development [9]. Small firms also attempt to adopt renewable energy technologies, which are supplemented with government support and their willingness to improve energy efficiency for enhancing their competitiveness [8].

Saudi Arabia (SA) was traditionally identified by its heavy reliance on fossil fuels for energy, as the kingdom holds significant reserves of oil and gas, which have a substantial impact on the global oil supply [10]. Nonetheless, international decarbonization pressures and climate change have shifted countries toward renewable energy [11]. Therefore, South Africa has developed a national program for renewable energy, targeting 58.7 GW of production by 2030 [12]. The program aims to make the best use of natural resources, i.e., land and sun. It targets positioning the kingdom as a key leader in renewable energy within the Middle East; however, there are several challenges, such as high initial costs associated with such projects, infrastructure upgrades, a skilled workforce, and harsh weather with high dust levels in some regions of the kingdom [12]. Renewable energy is not just a source of energy in SA; it is a key factor for economic diversification and environmental sustainability, aligning with Saudi Vision 2030 and its associated initiatives, such as the Green Saudi Initiative (Ismaeil & Sobaih, 2023).

Despite growing studies on renewable energy adoption, especially in the SA context [7, 8, 12, 13], none of the published studies, to the best of our knowledge, have examined the factors that affect organizational intent to adopt renewable energy. This research bridges this gap in knowledge and adopts the theory of planned behavior (TPB), which suggests that behavior of individuals is stimulated by intention, which is affected by three antecedents: attitudes toward behavior (ATT), subjective norms (SN), and perceived behavioral control (PBC) [14]. The situation at organizations is similar to that of individuals, as there are three antecedents of organizational intention to adopt certain behaviors: managerial attitudes, stakeholder influences, and resource availability [15]. Studies have confirmed this notion as Alsulami et al. [7] noted that the adoption of SV in SA was affected by attitudes towards solar energy. The organizational attitude is often shaped by cost-benefit analysis and organizational values [16]. This means that when managers value green transformation, they have a higher intention to go green [17]. Furthermore, family and peers' pressures were also found to affect entrepreneurs' intention to go green [6]. At the organizational level, pressures often come from all stakeholders, such as competitors, suppliers, customers, and the government [18, 19]. PBC in organizations relates to resource availability within organizations and includes their access to external support mechanisms, such as government grants or technical partnerships. The study also builds on the Resource-Based View (RBV) theory [20], which theorizes that organizational competitive advantage and key decisions should be based on its unique resources and capabilities. The current research assumes that the adoption of renewable energy in organizations relies on resources (which also overlap with PBC in TPB) and the knowledge of those involved in the process.

The integration of TPB and RBV enabled a better lens to understand renewable energy adoption in Saudi organizations. This research explores the variables that drive organizational intention to shift towards renewable energy using the frameworks of TPB and RBV. More specifically, the purpose of this research is to examine the variables that influence an organization's decision to adopt renewable energy, utilizing the three antecedents of TPB (ATT, SN, PBC) and the knowledge of senior management as a key driver for organizational intention to adopt renewable energy. Furthermore, the study tests the moderating effect of government policies related to green energy in Saudi Arabia on the aforementioned relationships. It is expected that these policies would play a critical role in such relationships, although, to the best of our knowledge, this has not been previously studied.

To fulfill the research purpose, the next section of this paper begins with reviewing related literature and formulating the research hypotheses within the research framework (section 2). It then describes the research design employed in this study, including the methods used for collecting and analyzing primary data (section 3). The collected data are subsequently analyzed using both SPSS and SmartPLS after confirming their validity and reliability (section 4), and the results are presented, including the research structural model. The obtained results are then discussed (section 5), and both theoretical and practical implications are outlined (section 6). Final remarks and the conclusion of the study are presented (section 7).

2. Hypotheses Building

2.1. Organizational Attitude

Organizational attitudes toward renewable energy are shaped by the perceived environmental, economic, and reputational benefits perceived by managers and teams. A survey of 500 global firms found that 68% viewed renewables as critical for achieving net-zero targets, citing reduced regulatory risks and enhanced brand loyalty [21]. In SA, companies associate solar adoption with long-term cost savings, given the Kingdom's high diesel-generated electricity prices [22]. Reputational benefits are equally salient, whereby firms aligning with Vision 2030 through environmental, social, and governance (ESG) disclosures experience improved stakeholder trust and a significant increase in return on investment [23]. These positive attitudes are reinforced by case studies demonstrating successful transitions, such as Saudi Aramco's solar-powered oilfields, which have shown a potential natural gas saving of 555,515 MMBtu, significant cost savings, and a notable reduction in CO₂ emissions [24].

Organizational attitudes toward renewable energy adoption act as critical determinants of behavioral intentions within organizations [14]. Perceptions of benefits, such as cost savings from reducing reliance on high diesel-generated electricity prices, environmental sustainability, and reputational enhancement tied to national goals, shape this attitude positively. Research [21-23] shows that Saudi organizations recognize the economic advantages and positioning aligned with Vision 2030, which promotes renewable energy as a strategic priority. These favorable views are reinforced by practical examples, such as solar-powered projects that demonstrate tangible outcomes in cost efficiency and corporate image. Consequently, this suggests:

H₁: Attitude towards renewable energy adoption significantly influences the intention to adopt renewable energy among Saudi organizations.

2.2. Stakeholder Influences

Stakeholder influences are the social networks that stimulate the organization with a desire to adopt certain behaviors. They shape organizational intentions by reflecting expectations from stakeholders and behaviors of industry peers [14]. The Saudi Vision 2030 articulates a clear societal expectation for all entities, including organizations, to contribute towards its objectives, which prominently include diversifying the energy mix and enhancing sustainability through renewable energy development [12]. Similarly, government endorsement of renewable energy through policies, initiatives, and investments sends a strong signal to organizations about the national priority and legitimacy of renewable energy, reinforcing normative expectations. For instance, campaigns such as the Saudi Green Initiative frame sustainability as a collective responsibility, fostering a culture of environmental stewardship [12]. Furthermore, public discourse and media coverage of Vision 2030 and its sustainability goals further amplify societal awareness and expectations for organizations to align with these national objectives, thereby increasing normative pressure. In this context, public sector entities set an example, with ministries and state-owned enterprises mandated to achieve 30% renewable energy use by 2025, Islam and Ali [12]. Recent studies in SA have shown that Saudi entrepreneurs are more interested in going green because of their peers [6]. The Vision 2030 establishes norms and encourages all stakeholders to go green [12]. Based on this discussion, it could be suggested that:

H₂: Stakeholder pressures influence intention to adopt renewable energy in Saudi organizations.

2.3. Resource Availability

Various resources shape an organization's perceived control over the adoption of renewable energy [15]. These include financial, technical, and human resources. Financial resources are important for the successful adoption of renewable energy. Access to low-interest green loans and government grants alleviates financial barriers [25]. Similarly, technical challenges, such as grid integration and maintenance, require collaboration with international experts [12]. Organizations with strong technical capabilities or access to external technical support perceive a higher degree of control over the technical complexities of renewable energy projects. Moreover, human resources, including skilled personnel, managerial expertise, and workforce capacity, are vital for project planning, implementation, and operation of renewable energy systems. Organizations with adequate human capital perceive greater control over their ability to manage and execute renewable energy initiatives effectively [12]. Therefore, the availability and accessibility of these resources directly enhance organizational perceived behavioral control, making renewable energy adoption appear more achievable and increasing the likelihood of implementation. Organizational agility and risk management strategies influence perceived control. Firms with decentralized decision-making structures adopt renewables faster, as they can swiftly allocate budgets and approve projects [26]. Risk mitigation mechanisms, such as PPAs and insurance against technological obsolescence, further enhance confidence [27]. Conversely, bureaucratic inertia in large state-owned enterprises delays project implementation, as observed in Saudi Electricity Company's delayed wind farm approvals [10]. Based on this, it could be suggested:

H₃: Availability of resources and overcoming challenges influence the intention to adopt renewable energy among Saudi organizations.

2.4. Knowledge

Managers' awareness of the advantages of renewable energy technologies, related government regulations, and support programs is all important for ensuring full compliance with regulations and policies [7]. A recent study on Sudi organizations showed higher efficiency for adopting solar energy compared to other organizations [28]. However, a knowledge gap may exist among small businesses [17]. Small firms may lack sufficient knowledge and dedicated teams, leading to resistance to shifting to renewable energy adoption [7]. Recent research by Sobaih and Elshaer [29] shows that entrepreneurs' knowledge influences their positive attitude towards investment. It was also found that awareness of the benefits of green adoption influences attitude and intention to adopt environmentally friendly practices [17]. Studies [7, 12] show that awareness of these factors enables organizations to align decisions with sustainability goals and Vision 2030 incentives. This knowledge equips leaders to evaluate opportunities and navigate challenges independently of attitude formation. Accordingly, this suggests:

H₄: Knowledge about renewable energy affects Saudi organizations' attitude towards renewable energy adoption.

H₅: Knowledge about renewable energy significantly influences the intention to adopt renewable energy among Saudi organizations.

2.5. The Role of Government Policies

Policies can influence organizational attitudes by directly affecting their perceptions of the advantages of renewable energy. Generous feed-in tariffs or renewable energy credits increase the revenue potential of renewable energy projects, directly improving the business case and enhancing the economic benefits perceived by organizations [30]. Tax incentives, such as investment and production tax credits, reduce the net costs of renewable energy investments, making them financially more attractive and fostering positive attitudes towards adoption [30, 31]. Furthermore, clear and consistent policy signals from the government convey a long-term commitment to renewable energy, reducing policy risk and enhancing organizations' confidence in the sustainability of renewable energy investments, thereby further strengthening positive attitudes [7].

Governmental policies also have the potential to moderate the effect of stakeholders' pressures on organizational intentions to adopt renewable energy. This is because such pressures could be shaped and affected by government policies [32]. Vision 2030, for example, has shaped the public and organizations' adoption of certain behaviors, e.g., going green [33, 34]. This puts pressure on organizations to adopt green energy and creates a public expectation for organizations to contribute to national goals. Government policies also address resource constraints and remove challenges for renewable energy adoption. This could include national programs of support and the removal of bureaucratic hurdles [35]. Lastly, technical assistance programs, such as technical advisory services, capacity-building workshops, and information dissemination platforms, provide organizations with the technical knowledge and expertise needed to implement renewable energy projects successfully, bolstering their perceived control over technical aspects [35]. By mitigating financial, regulatory, and technical barriers, government policies directly enhance an organization's perceived behavioral control, making renewable energy adoption more feasible and less uncertain, and thus fostering a sense of empowerment and capability to undertake sustainable energy initiatives. Policy provides tangible support, empowering organizations to act on sustainable intentions. Thus, these suggest:

H₆: Government policies moderate the positive association between knowledge and intention to approve renewable energy among Saudi organizations.

H₇: Government policies moderate the positive association between attitude and intention to approve renewable energy among Saudi organizations.

H₈: Government policies moderate the positive association between subjective norms and intention to approve renewable energy among Saudi organizations.

H₉: Government policies moderate the positive association between perceived behavioral control and intention to approve renewable energy among Saudi organizations.

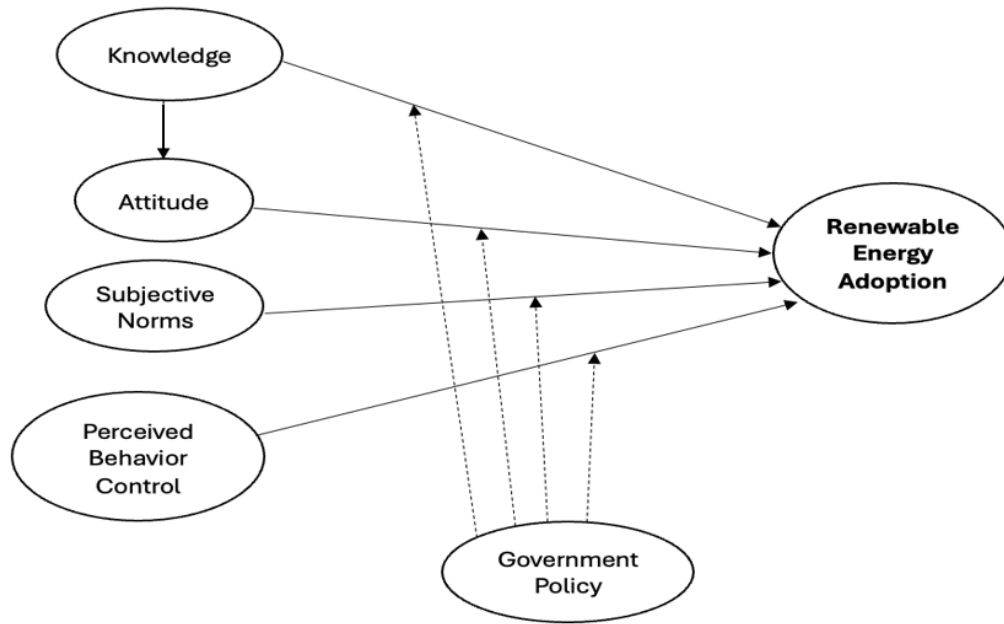


Figure 1.
The study models.

3. Methodology

The study adopted a quantitative approach using a survey-based method for data collection. The use of this approach and tool was appropriate for collecting information regarding their adoption of renewable energy. The adoption of online surveys was used to reach as many organizations as possible, which has become most common in management research [36]. The study used pre-examined constructs, which included the three antecedents of TPB and intention to adopt, as well as government policy [14, 15]. As discussed earlier, knowledge was also adopted as an independent variable, and the scale was derived from previous studies [7, 37]. A 5-point Likert scale was used in this study, “1 = strongly disagree and 5 = strongly agree.

The questionnaire was developed using pre-examined items and distributed electronically via Google Forms. It took approximately 10 minutes to complete. Participants were provided with a consent page at the beginning of the questionnaire, clarifying the study's purpose and obtaining their consent for participation while ensuring the full respect of their privacy. Participants were identified through professional contacts, including university peers and industry colleagues. Data was collected from 241 senior managers in Saudi organizations across various sectors. The responses were primarily from medium-sized firms, which were geographically dispersed across the kingdom. There were no responses from small firms, and a few responses (31 out of 241) were from large firms. Mega firms, such as Saudi Aramco, were not included in this study.

Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) (Hair et al., 2021). The software employed was SmartPLS4 (version 4.1.0.9). The reliability and validity of the measures and collected data were assured before proceeding with data analysis. The structural model was used to test hypotheses and examine the interrelationships between constructs. To evaluate the significance of path coefficients, bootstrapping with 5,000 subsamples was implemented in this study.

4. Results

4.1. Indicator Reliability

Table 1 presents the outer loadings for all indicators that exceed the threshold of 0.7. For instance, attitude indicators (Att1 = 0.919, Att2 = 0.928, Att3 = 0.914) exhibit strong loadings, indicating reliable measurement. Similarly, intention indicators (Int1 = 0.883, Int2 = 0.908, Int3 = 0.927, Int4 = 0.872) surpass the threshold, confirming their association with the construct. The government policies construct shows loadings of Gov1 = 0.920, Gov2 = 0.904, and Gov3 = 0.905, while knowledge indicators are Know1 = 0.905, Know2 = 0.923, and Know3 = 0.854. The interaction terms (e.g., Gov_Policies x Attitude) have loadings of 1.000, as they are single-indicator constructs. These high loadings indicate that the items successfully capture their variables. The results affirm the reliability of the adopted scale.

Table 1.

Outer loadings.

	Outer loadings
Att1 <- Attitude	0.919
Att2 <- Attitude	0.928
Att3 <- Attitude	0.914
Gov1 <- Gov_Policies	0.920
Gov2 <- Gov_Policies	0.904
Gov3 <- Gov_Policies	0.905
Gov_Policies x Attitude -> Gov_Policies x Attitude	1.000
Gov_Policies x PBC -> Gov_Policies x PBC	1.000
Gov_Policies x Subjective Norms -> Gov_Policies x Subjective Norms	1.000
Int1 <- Intention	0.883
Int2 <- Intention	0.908
Int3 <- Intention	0.927
Int4 <- Intention	0.872
Know1 <- Knowledge	0.905
Know2 <- Knowledge	0.923
Know3 <- Knowledge	0.854
PBC1 <- PBC	0.920
PBC2 <- PBC	0.922
PBC3 <- PBC	0.922
SN1 <- Subjective Norms	0.914
SN2 <- Subjective Norms	0.845
SN3 <- Subjective Norms	0.880

4.2. Internal Consistency Reliability

Internal consistency reliability ensures that the indicators of each construct measure the same underlying concept. Table 2 presents Cronbach's alpha, composite reliability (ρ_a), and composite reliability (ρ_c) for each variable, all exceeding 0.7. For example, Attitude has an alpha of 0.910, ρ_a of 0.912, and ρ_c of 0.943, indicating excellent consistency. The intention reports values of 0.920, 0.921, and 0.943, respectively, while Subjective Norms has an alpha of 0.856, ρ_a of 0.877, and ρ_c of 0.911. The Perceived Behavioral Control (PBC) construct demonstrates alpha = 0.911, ρ_a = 0.911, and ρ_c = 0.944, and Government Policies shows alpha = 0.896, ρ_a = 0.898, and ρ_c = 0.935. Knowledge also meets the criteria with alpha = 0.875, ρ_a = 0.884, and ρ_c = 0.923. These metrics assure that the constructs exhibit strong internal consistency. The high reliability scores support the coherence of the measurement model.

Table 2.

Construct reliability and validity.

	Cronbach's alpha	Composite reliability (ρ_a)	Composite reliability (ρ_c)	Average variance extracted (AVE)
Attitude	0.910	0.912	0.943	0.847
Gov_Policies	0.896	0.898	0.935	0.828
Intention	0.920	0.921	0.943	0.806
Knowledge	0.875	0.884	0.923	0.800
PBC	0.911	0.911	0.944	0.849
Subjective Norms	0.856	0.877	0.911	0.774

4.3. Convergent Validity

Convergent validity assesses if the indicators of a variable share a high proportion of variance. Table 2 includes the Average Variance Extracted (AVE), all exceeding the threshold of 0.5. Attitude has an AVE of 0.847, intention has 0.806, and government policies have 0.828, indicating robust convergent validity. Knowledge shows an AVE of 0.800, while PBC reports 0.849, and subjective norms have 0.774, the lowest yet still acceptable value. These values demonstrate that the indicators explain a substantial portion of their constructs' variance. The results validate the measurement model's ability to capture the intended constructs accurately. As such, confirmation strengthens the foundation for subsequent structural analysis.

4.4. Discriminant Validity

Discriminant validity verifies that constructs are distinct from one another. Discriminant validity warrants that constructs in the study are distinct from one another. Table 3 presents the Fornell-Larcker criterion, where the square root of each construct's average variance extracted (AVE) exceeds its correlations with other constructs. For instance, Attitude has a square root AVE of 0.920, which is greater than its correlation with Intention (0.764) or Gov_Policies (0.506), while Intention

has a square root AVE of 0.898, surpassing its associations with other variables. Table 4 provides the heterotrait-monotrait (HTMT) ratios, most of which are below the threshold of 0.85, such as Gov_Policies and Attitude (0.560). However, the HTMT ratio between Knowledge and Perceived Behavioral Control (PBC) is 0.930, exceeding the typical cutoff of 0.85, indicating potential overlap. This high ratio is deemed acceptable because Knowledge, which reflects understanding of renewable energy, and PBC, which pertains to the perceived capability to adopt it, are theoretically related yet distinct concepts. Additionally, an HTMT of 0.930 is only slightly above the higher acceptable limit of 0.90, often applied when constructs share theoretical connections [9]. The model's robust performance, demonstrated by an R^2 of 0.793 for Intention and significant path coefficients, indicates that this overlap does not undermine the overall analysis.

Table 1.
Fornell-Larcker criterion.

	Attitude	Gov_Policies	Intention	Knowledge	PBC	Subjective Norms
Attitude	0.920					
Gov_Policies	0.506	0.910				
Intention	0.764	0.629	0.898			
Knowledge	0.781	0.618	0.785	0.895		
PBC	0.796	0.511	0.793	0.834	0.921	
Subjective Norms	0.618	0.692	0.729	0.737	0.704	0.880

Table 2.
HTMT ratio.

	Heterotrait-Monotrait Ratio (HTMT)
Gov_Policies <-> Attitude	0.560
Intention <-> Attitude	0.833
Intention <-> Gov_Policies	0.692
Knowledge <-> Attitude	0.870
Knowledge <-> Gov_Policies	0.709
Knowledge <-> Intention	0.872
PBC <-> Attitude	0.873
PBC <-> Gov_Policies	0.566
PBC <-> Intention	0.865
PBC <-> Knowledge	0.930
Subjective Norms <-> Attitude	0.691
Subjective Norms <-> Gov_Policies	0.782
Subjective Norms <-> Intention	0.805
Subjective Norms <-> Knowledge	0.843
Subjective Norms <-> PBC	0.787

4.5. Structural Model

The structural model evaluation examines the relationship between variables to test the hypotheses. This analysis uses the PLS algorithm and bootstrapping with 5,000 subsamples, as shown in Figure 2. Table 5 presents path coefficients, t-statistics, and p-values from bootstrapping. Attitude significantly affects Intention ($\beta = 0.214$, $t = 3.337$, $p = 0.001$), supporting H1. Subjective Norms also affected Intention significantly ($\beta = 0.297$, $t = 3.692$, $p < 0.001$), supporting Hypothesis 2. Similarly, PBC impacts Intention positively ($\beta = 0.183$, $t = 2.288$, $p = 0.022$), validating Hypothesis 3. Knowledge influences Attitude strongly ($\beta = 0.781$, $t = 24.256$, $p < 0.001$) and Intention directly ($\beta = 0.156$, $t = 2.312$, $p = 0.021$), supporting Hypotheses 4 and 5. Government Policies directly affect Intention ($\beta = 0.161$, $t = 2.965$, $p = 0.003$), indicating a significant role. Subjective norms exhibit the strongest effect, followed by attitude, PBC, Gov_Policies, and knowledge. These findings indicate that social pressures, personal beliefs, perceived control, government support, and knowledge all influence adoption intentions. The statistical significance of all paths highlights their importance in Saudi Arabia. The link between knowledge and attitude demonstrates a strong linkage. Table 5 shows a path coefficient of $\beta = 0.781$ ($p < 0.001$) for Knowledge to Attitude. This result suggests that greater knowledge about renewable energy significantly enhances positive attitudes toward its adoption.

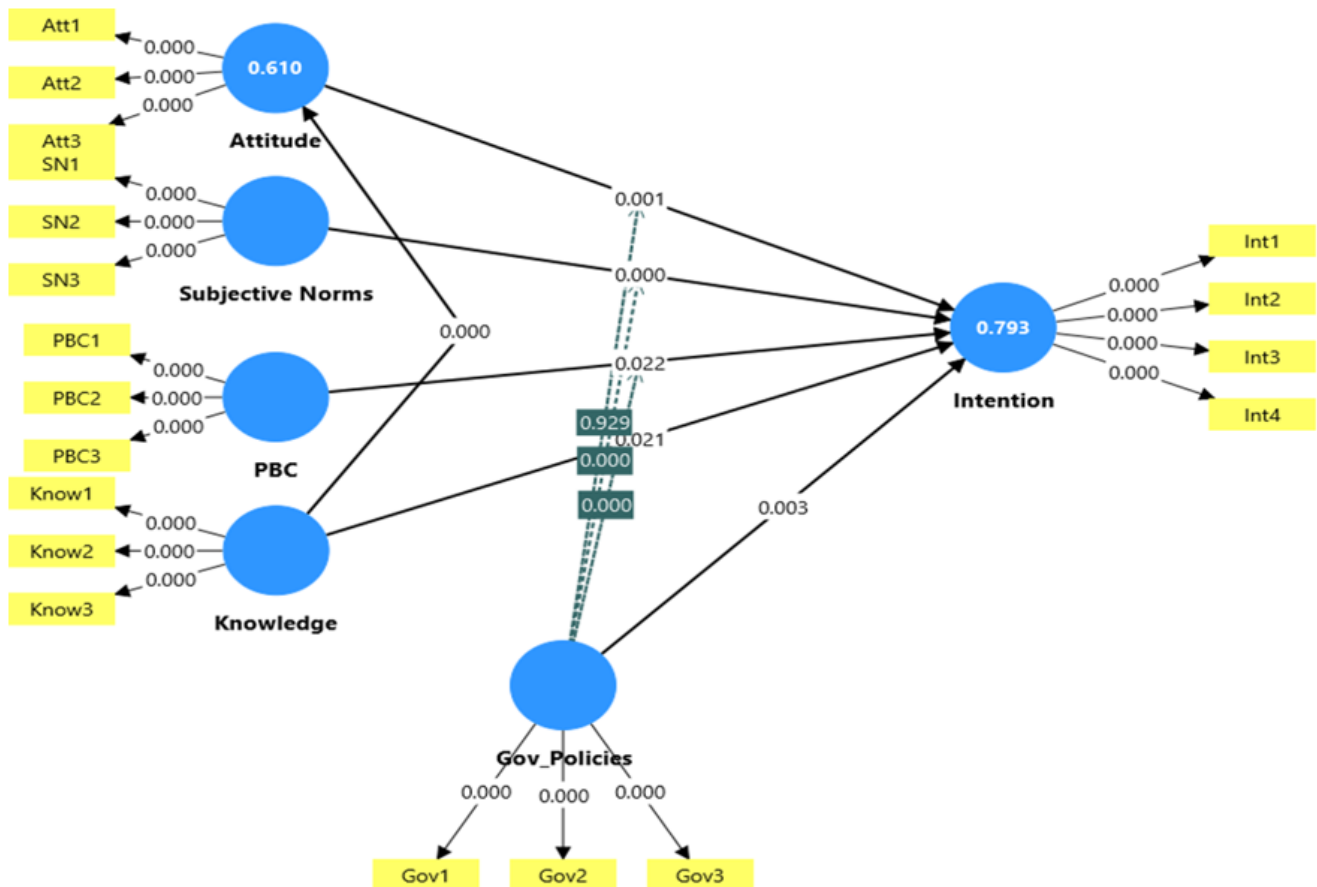


Figure 2.
Structural model.

Table 5.
Summary of research findings.

Hypotheses	β	T-Statistics	p-Values	Outcome
Direct Hypotheses				
H1: Attitude -> Intention	0.214	3.337	0.001	Supported
H2: Subjective Norms -> Intention	0.297	3.692	0.000	Supported
H3: Perceived Behavioral Control -> Intention	0.183	2.288	0.022	Supported
H4: Knowledge -> Attitude	0.781	24.256	0.000	Supported
H5: Knowledge -> Intention	0.156	2.312	0.021	Supported
Moderating Hypotheses				
H6: Gov_Policies x Attitude -> Intention	0.006	0.089	0.929	Not-Supported
H7: Gov_Policies x Subjective Norms -> Intention	-0.245	3.743	0.000	Not-Supported
H8: Gov_Policies x Perceived Behavioral Control -> Intention	0.335	3.557	0.000	Supported

4.6. Moderating Effects of Government Policies

The moderating influence of Government Policies on TPB constructs is analyzed through interaction terms. Table 5 shows that the interaction between Government Policies and PBC significantly enhances Intention ($\beta = 0.335$, $t = 3.557$, $p < 0.001$), supporting Hypothesis 8. The interaction between Government Policies and Subjective Norms negatively affects Intention ($\beta = -0.245$, $t = 3.743$, $p < 0.001$), suggesting policies weaken this relationship. The interaction between government policies and attitude is not significant ($\beta = 0.006$, $t = 0.089$, $p = 0.929$), indicating that policies do not alter attitude's effect on intention. The positive moderation on perceived behavioral control suggests that supportive policies strengthen perceived control's impact on adoption intentions. Conversely, the negative effect on subjective norms implies that policies may override social pressures.

4.7. Model Explanatory Power (R-Square)

The R-squared values indicate the model's explanatory strength. Table 6 shows Attitude with an R^2 of 0.610 and Intention with an R^2 of 0.793. These values indicate that the model explains 61.0% of the variance in Attitude and 79.3% in Intention. The high R^2 for Intention reflects the model's robust ability to account for adoption intentions. The moderate R^2 for Attitude suggests that additional factors may influence it beyond Knowledge. Both values are statistically significant ($p < 0.001$),

confirming the model's reliability. These results indicate a robust model fit for explaining renewable energy adoption in Saudi organizations.

Table 3.
R-Square.

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
Attitude	0.610	0.612	0.050	12.211	0.000
Intention	0.793	0.802	0.025	32.208	0.000

4.8. Effect Sizes (*f*-square)

Effect sizes quantify the impact of predictors on endogenous constructs. Table 7 shows that Knowledge has a large effect on Attitude ($f^2 = 1.567$, $t = 4.572$, $p < 0.001$), emphasizing its critical role. Meanwhile, Subjective Norms exert a small to medium effect on Intention ($f^2 = 0.128$, $t = 1.615$, $p = 0.106$), while Attitude ($f^2 = 0.064$, $t = 1.663$, $p = 0.096$) and PBC ($f^2 = 0.035$, $t = 1.007$, $p = 0.314$) have smaller effects. The moderating effect of government policies on PBC-Intention is small to medium ($f^2 = 0.116$, $t = 2.031$, $p = 0.042$), and on Subjective Norms-Intention is small ($f^2 = 0.089$, $t = 1.881$, $p = 0.060$). Government policies' direct effect on intention is small ($f^2 = 0.059$, $t = 1.258$, $p = 0.208$). These effect sizes clarify the relative contributions of each predictor. The varying magnitudes guide prioritization in policy and organizational strategies.

Table 7.
F-square.

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
Attitude -> Intention	0.064	0.069	0.038	1.663	0.096
Gov_Policies -> Intention	0.059	0.072	0.047	1.258	0.208
Gov_Policies x Attitude -> Intention	0.000	0.006	0.009	0.006	0.995
Gov_Policies x PBC -> Intention	0.116	0.119	0.057	2.031	0.042
Gov_Policies x Subjective Norms -> Intention	0.089	0.096	0.047	1.881	0.060
Knowledge -> Attitude	1.567	1.620	0.343	4.572	0.000
Knowledge -> Intention	0.025	0.029	0.022	1.139	0.255
PBC -> Intention	0.035	0.043	0.035	1.007	0.314
Subjective Norms -> Intention	0.128	0.139	0.079	1.615	0.106

5. Discussion

This study explored the organizational intention to shift towards renewable energy using an integrated framework of TPB and RBV. It examined the impact of the three antecedents of TPB (ATT, SN, PBC) along with knowledge on organizational intention to adopt renewable energy, with the moderating effect of government policies. The results suggest that ATT, SN, and PBC affect the adoption intention of renewable energy among Saudi organizations. This supports TPB, which identifies primary drivers of behavioral intention, as earlier noted by Ajzen [14] and Li et al. [15]. Research by Alsulami et al. [7] presented the same findings, showing that positive attitudes toward solar energy enhance intent for adoption. Perceived benefits like cost savings and reputational enhancement are important for this positive behavior. Similarly, Aliedan et al. [6] highlighted how SN, such as peer competition, influences decisions for green investment, while PBC reflects resource readiness. The confirmation of these direct effects validates TPB's applicability in the context of SA's organizations. Therefore, it reflects the underlying interrelationship of internal beliefs and external pressures in driving renewable energy adoption.

ATT appears to have a notable impact on renewable energy. Table 5 demonstrates a marginally significant effect. Such an effect suggests that favorable perceptions strongly influence adoption decisions. This finding concurs with Gibiser [21], who reports that organizations globally view renewables as essential for sustainability targets. Narrowing down to SA's context, Zubair [22] noted that the high cost of diesel-generated electricity positions renewable energy as an economically viable option, enhancing positive attitudes. Additionally, Firmansyah et al. [23] emphasized that siding with Vision 2030's goals boosts corporate reputation, further strengthening organizational attitudes. The evidence highlights the importance of cultivating positive perceptions through economic and reputational incentives to promote renewable energy adoption. Moreover, the economic incentive stems from the potential reduction in operational costs over time, as renewable energy sources like solar power offer a hedge against volatile fossil fuel prices. Such a factor is more relevant in SA's energy-intensive economy. This economic rationale is complemented by reputational gains, as organizations adopting renewables signal commitment to national diversification efforts, enhancing their standing among stakeholders. Danish et al. [24] provided concrete evidence through Saudi Aramco's solar-powered oilfields, which demonstrate substantial cost savings and

environmental benefits, further reinforcing positive attitudes. The significant path coefficient reflects how these perceptions translate into a measurable intent to adopt, distinguishing Saudi organizations from those in regions where economic drivers may be less pronounced. This dynamic highlights the need for strategies that emphasize both immediate and long-term advantages to sustain and amplify organizational attitudes toward renewable energy.

SN exerts the strongest influence on intention among the core constructs of TBP. The results indicate that social pressures significantly drive adoption intentions. Like Aliedan et al. [6] and Tetra Pak. (2024) [38] the findings support the notion that the majority of Saudis prefer environmentally conscious brands, creating stakeholder pressure. With such a high number of consumers leaning towards environmental consciousness, more organizations in the country are naturally compelled to do the same and tap into the growing market. Abu-Bakar and Almutairi [39] further elaborate the same by showcasing consumer preferences for sustainable brands, amplifying normative pressure. Alyahya et al. [40] noted that peer benchmarking encourages organizations to emulate sustainability practices, while Islam and Ali [12] highlighted Vision 2030's role in embedding sustainability into national expectations. This could be due to collectivist Saudi culture, as Saudis are highly influenced by each other. In organizations, there is collective influence from various stakeholders, e.g., competitors, suppliers, and customers. Collective culture [17, 37, 41] reinforces this stakeholders' influence as organizations are more likely to align with community and industry communities as well as national directions and initiatives in environmental sustainability, i.e., Vision 2030 and SGI. Therefore, organizations are motivated to follow the national directions. The statistical results of this study justify this notion.

The results revealed that knowledge has a significant influence on both attitude and intention regarding renewable energy adoption. This indicates that organizations develop a positive attitude towards renewable energy when they have information about renewable energy technologies, benefits, and how it could be adopted. This knowledge also has a direct, significant influence on the intention to adopt. These results support the literature on renewable energy adoption, especially in the Saudi context. For example, Alsulami et al. [7] noted a positive link between knowledge and attitude toward technological options. Additionally, Al-Hanoot et al. [28] revealed that when management and firms are aware of renewable energy technologies, they have higher efficiency in using these technologies. Moreover, Islam and Ali [12] found that firms with knowledge about incentives provided by national programs on renewable energy have a higher adoption rate of renewable energy.

The results also revealed that the government moderates the relationship between perceived behavioral control or resources and intention. This means that the current policies enhance the effect of resource impact on the adoption intention of renewable energy. This result concurs with Michoud et al. [35], who argued that financial support enhances PBC, which is critical for the intention of adoption. Similarly, Wang et al. [42] noted that feed-in tariffs are important for reducing financial challenges. Overcoming such financial and technological challenges through supportive policies enables organizations to demonstrate a positive intention towards the adoption of renewable energy. In the same line, Akhtaruzzaman et al. [43] found that government policies, including technical support and subsidies, reduce barriers and enhance the intention of adoption. On the other hand, there is a negative moderating effect of government policies on the link between subjective norms or stakeholders and intention. This means that strong policies may reduce the relative influence of social pressures. Such negative moderation highlights the dominant role that government policies can play in shaping organizational behavior, potentially overshadowing the influence of subjective norms. This disagrees with Bastini et al. [32], who found that policies shape SN with organizations, which strengthens its effect on the intention of adoption. Alternatively, firms might perceive policy mandates as sufficient justification for adoption, diminishing the need for stakeholder-driven norms [39]. This unexpected shift prompts further exploration of policy-social interactions within the country's context. This negative effect implies that strong policies may shift organizational focus from external norms to compliance-driven motivations, thereby reducing the relative influence of stakeholders. This finding diverges from Alyahya et al. [40], who emphasized the importance of peer-driven pressures, suggesting that external norms could be secondary in a policy-heavy environment. The statistical significance of this moderation highlights a unique Saudi perspective, wherein Vision 2030's directives may take precedence over traditional social cues [12]. Such a pattern calls for careful consideration in designing interventions that incorporate both regulatory authority and societal influence. However, no significant moderating effect occurs on the attitude-intention relationship. This outcome diverges from expectations based on prior research suggesting that policy support enhances attitudinal impacts. Qadir et al. [31] state that incentives such as subsidies amplify positive attitudes by improving economic feasibility; however, this study finds no such effect. Christophers [30] similarly notes that financial mechanisms strengthen the business case for renewables, a dynamic not evident in the moderation result here. One explanation may be that Saudi organizations' positive attitudes, driven by Vision 2030's prominence. Islam and Ali [12] are already robust, rendering additional policy influence minimal. This suggests that policy efforts might be better directed elsewhere to maximize adoption impact.

The lack of moderation reflects the inherent strength of pre-existing attitudes, likely solidified by Vision 2030's pervasive influence, reducing the need for policy amplification. This stability contrasts with Gibiser [21], who ties attitudinal shifts to economic incentives globally, suggesting a Saudi-specific saturation point. The insignificant coefficient implies that attitudes, once formed, drive intention independently of policy reinforcement, as Firmansyah et al. [23] hint through reputational drivers. This resilience could stem from the national narrative's deep integration into organizational ethos, limiting the policy's marginal utility. The finding indicates a unique attitudinal foundation in SA. Thus, a strategic pivot toward enhancing control or knowledge may be beneficial rather than reinforcing already favorable beliefs.

6. Implications and Future Work

The findings offer substantial implications for policymakers and organizational leaders aiming to advance renewable energy adoption in SA and similar contexts. The strong effect of knowledge on attitude and intention highlights the necessity

of educational programs and media campaigns to raise awareness about shifting to green and renewable energy technologies. It is important that policies address resource constraints, a point also emphasized by Soyombo et al. [44], who note SMEs' challenges with adoption complexities. The significant roles of ATT, SN, and PBC mirror global patterns, as Wall et al. [5] note positive attitudes driving adoption in Europe, SA's stronger SN reflects its collectivist culture and Vision 2030 emphasis [12]. Hence, policies should aim at creating social pressure to shift to green energy. The direct and moderating effects of government policies reflect observations of policy-driven transitions, yet SA's proactive stance, exemplified by REPDO [45] surpasses less comprehensive frameworks like the UAE's Masdar Initiative [46]. SA has concentrated diversification efforts, as Puyo et al. [11] discuss the reduction of fossil fuel dependency, which emphasizes the importance of national policies and cultural factors in applying the Theory of Planned Behavior (TPB) globally. Consequently, the study contributes to the broader discourse while emphasizing context-specific approaches to renewable energy adoption.

Limitations provide room for further research to refine the understanding of renewable energy adoption. First, the results indicate a high HTMT ratio between knowledge and perceived behavioral control (0.930), suggesting potential conceptual overlap despite theoretical distinction. Therefore, a qualitative investigation into these constructs' boundaries is required. Comparative studies with GCC peers could illuminate regional variations, enhancing generalizability beyond, as also noted by Almasri and Narayan [46]. Second, the focus on Saudi organizations limits generalizability, necessitating comparative studies across different cultural contexts. Third, the unexpected negative moderation of government policies on subjective norms warrants deeper investigation into policy-social dynamics, potentially building on Qadir et al. [31]. More detailed and longer longitudinal research tracking actual adoption behaviors could validate the intention-action link, extending Wall et al. [5]. These gaps offer opportunities to enhance the model's precision and applicability. Likewise, the cross-sectional design limits causal inference, suggesting that experimental or longitudinal approaches might clarify directional relationships. These methodological enhancements would bolster the robustness of findings, addressing current constraints. Such advancements could refine theoretical and practical understanding of adoption drivers.

7. Conclusion

This study integrated TPB and RBV to examine the impact of three antecedents of TPB (ATT, SN, PBC) along with knowledge on organizational intention to adopt renewable energy in Saudi Arabia, with the moderating effect of government policies. The results confirmed the direct positive influence of ATT, SN, PBC, and knowledge on organizational intention to adopt green energy. It also confirmed the moderating effect of government policies on the relationship between PBC and organizational intention to adopt renewable energy. This indicates that policies should focus on providing adequate financial and technological support, which significantly affects organizational intention for renewable energy adoption. However, government policies were found to weaken the link between SN or stakeholder pressure and intention. This suggests that policies do not effectively influence stakeholder pressure. Additionally, policies did not alter the effect of attitude on the intention to adopt renewable energy. Policies were also insufficient to moderate the positive impact of ATT and knowledge on organizational intention. Therefore, policies need to be revisited to address these issues and promote a shift towards renewable energy. As Saudi Arabia pursues this transition to green energy, the insights gained here can inspire a resilient energy future, positioning the Kingdom as a leader in the global movement toward sustainability.

References

- [1] IEA., *Renewables 2023 analysis - IEA*. 2025. <https://www.iea.org/reports/renewables-2023/executive-summary>
- [2] A. G. Olabi et al., "Renewable energy systems: Comparisons, challenges and barriers, sustainability indicators, and the contribution to UN sustainable development goals," *International Journal of Thermofluids*, vol. 20, p. 100498, 2023. <https://doi.org/10.1016/j.ijft.2023.100498>
- [3] K. K. Jaiswal et al., "Renewable and sustainable clean energy development and impact on social, economic, and environmental health," *Energy Nexus*, vol. 7, p. 100118, 2022. <https://doi.org/10.1016/j.nexus.2022.100118>
- [4] H. L. M. Benhacene and A. M. Hussien, "The impact of adopting renewable energy resources on sustainable development in Saudi Arabia: A qualitative view," *Sustainability*, vol. 17, no. 2, p. 768, 2025. <https://doi.org/10.3390/su17020768>
- [5] W. P. Wall, B. Khalid, M. Urbański, and M. Kot, "Factors influencing consumer's adoption of renewable energy," *Energies*, vol. 14, no. 17, p. 5420, 2021. <https://doi.org/10.3390/en14175420>
- [6] M. M. Aliedan, M. A. Alyahya, I. A. Elshaer, and A. E. E. Sobaih, "Who is going green? Determinants of green investment intention in the Saudi food industry," *Agriculture*, vol. 13, no. 5, p. 1047, 2023. <https://doi.org/10.3390/agriculture13051047>
- [7] A. Alsulami, J. Fairbrass, T. Botelho, and S. Assadinia, "Renewable energy and innovation in Saudi Arabia: An exploration of factors affecting consumers' intention to adopt Solar PV," *Technological Forecasting and Social Change*, vol. 204, p. 123430, 2024. <https://doi.org/10.1016/j.techfore.2024.123430>
- [8] K. Ahmed, A. A. Shah, A. Bhutto, and Z. H. Sahito, "SME owners' willingness to adopt renewable energy technologies for socio-economic development: A perspective for policy decision makers," *Pakistan Journal of Humanities and Social Sciences*, vol. 12, no. 3, pp. 2470-2479, 2024. <https://doi.org/10.52131/pjhss.2024.v12i3.2441>
- [9] M. Stanitsas and K. Kirytopoulos, "Sustainable energy strategies for power purchase agreements," *Sustainability*, vol. 15, no. 8, p. 6638, 2023. <https://doi.org/10.3390/su15086638>
- [10] F. E. M. Suliman, "Solar- and wind-energy utilization in the kingdom of Saudi Arabia: A comprehensive review," *Energies*, vol. 17, no. 8, p. 1894, 2024. <https://doi.org/10.3390/en17081894>
- [11] D. M. Puyo, A. J. Pantón, T. Sridhar, M. Stuermer, C. Ungerer, and A. T. Zhang, *Key challenges faced by fossil fuel exporters during the energy transition*. International Monetary Fund, 2024.
- [12] M. T. Islam and A. Ali, "Sustainable green energy transition in Saudi Arabia: Characterizing policy framework, interrelations and future research directions," *Next Energy*, vol. 5, p. 100161, 2024. <https://doi.org/10.1016/j.nxener.2024.100161>

- [13] E. M. H. Ismaeil and A. E. E. Sobaih, "Heuristic approach for net-zero energy residential buildings in arid region using dual renewable energy sources," *Buildings*, vol. 13, no. 3, p. 796, 2023. <https://doi.org/10.3390/buildings13030796>
- [14] I. Ajzen, "The theory of planned behavior," *Organizational Behavior and Human Decision Processes*, vol. 50, no. 2, pp. 179-211, 1991. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- [15] X. Li *et al.*, "Mechanism of attitude, subjective norms, and perceived behavioral control influence the green development behavior of construction enterprises," *Humanities and Social Sciences Communications*, vol. 10, no. 1, pp. 1-13, 2023. <https://doi.org/10.1057/s41599-023-01724-9>
- [16] D. Hirschfeld and M. Wagner, "The interplay of attitudes, norms and control in sustainable entrepreneurship: An experimental analysis," *Sustainability*, vol. 14, no. 15, p. 9317, 2022. <https://www.mdpi.com/2071-1050/14/15/9317>
- [17] A. E. E. Sobaih, A. H. Abdou, H. Z. Alshamayleh, A. S. Alshebami, and A. E. Abu Elnasr, "Greening minds before businesses: navigating SDGs hurdles for micro and small hotels in Saudi Arabia," *Cogent Business & Management*, vol. 12, no. 1, p. 2459325, 2025. <https://doi.org/10.1080/23311975.2025.2459325>
- [18] M. T. Borges-Tiago, A. Almeida, F. G. B. Tiago, and S. M. M. Avelar, "Bridging the innovative attitude-behavior gap: A dual-level analysis," *Journal of Innovation & Knowledge*, vol. 9, no. 4, p. 100561, 2024. <https://doi.org/10.1016/j.jik.2024.100561>
- [19] F. Naatu, S. A. Nyarko, Z. H. Munim, and I. Alon, "Crowd-out effect on consumers attitude towards corporate social responsibility communication," *Technological Forecasting and Social Change*, vol. 177, p. 121544, 2022. <https://doi.org/10.1016/j.techfore.2022.121544>
- [20] J. B. Barney, "Resource-based theories of competitive advantage: A ten-year retrospective on the resource-based view," *Journal of Management*, vol. 27, no. 6, pp. 643-650, 2001. <https://doi.org/10.1177/014920630102700602>
- [21] N. Gibiser, "New NTT survey: Up to 95% of enterprises falling short of net-zero carbon goals," New York, 2024. <https://www.businesswire.com/news/home/20240924322524/en/New-NTT-Survey-Up-to-95-of-Enterprises-Falling-Short-of-Net-Zero-Carbon-Goals>
- [22] M. Zubair, "PV energy penetration in Saudi Arabia: current status, residential, and commercial users, local investment, use in modern agriculture," *International Journal of Sustainable Engineering*, vol. 17, no. 1, pp. 39-51, 2024. <https://doi.org/10.1080/19397038.2023.2297262>
- [23] E. A. Firmansyah, U. H. Umar, and R. S. Jibril, "Investigating the effect of ESG disclosure on firm performance: The case of Saudi Arabian listed firms," *Cogent Economics & Finance*, vol. 11, no. 2, p. 2287923, 2023. <https://doi.org/10.1080/23322039.2023.2287923>
- [24] S. N. Danish, Z. Almutairi, M. S. Alluqmani, and Y. A. Alghamdi, "Concentrated solar power integration with refinery process heaters," *Alexandria Engineering Journal*, vol. 82, pp. 195-207, 2023. <https://doi.org/10.1016/j.aej.2023.10.007>
- [25] A. Ali, F. A. Alsulaiman, K. Irshad, M. Shafiullah, S. Alam Malik, and A. Hameed Memon, "Renewable portfolio standard from the perspective of policy network theory for Saudi Arabia vision 2030 targets," in *2021 4th International Conference on Energy Conservation and Efficiency (ICECE)*, 2021, pp. 1-5. <https://doi.org/10.1109/icece51984.2021.9406286>
- [26] P. X. Hoa, V. N. Xuan, and N. T. P. Thu, "Determinants of renewable energy consumption in the fifth technology revolutions: Evidence from asean countries," *Journal of Open Innovation: Technology, Market, and Complexity*, vol. 10, no. 1, p. 100190, 2024. <https://doi.org/10.1016/j.joitmc.2023.100190>
- [27] W. Van Opstal and A. Smeets, "When do circular business models resolve barriers to residential solar PV adoption? Evidence from survey data in Flanders," *Energy Policy*, vol. 182, p. 113761, 2023. <https://doi.org/10.1016/j.enpol.2023.113761>
- [28] A. K. Al-Hanoot, H. Mokhlis, S. Mekhilef, M. Alghoul, H. Shareef, and A. M. Samatar, "Distributed PV systems in Saudi Arabia: Current status, challenges, and prospects," *Energy Strategy Reviews*, vol. 55, p. 101535, 2024. <https://doi.org/10.1016/j.esr.2024.101535>
- [29] A. E. E. Sobaih and I. A. Elshaer, "Risk-taking, financial knowledge, and risky investment intention: Expanding theory of planned behavior using a moderating-mediating model," *Mathematics*, vol. 11, no. 2, p. 453, 2023. <https://doi.org/10.3390/math11020453>
- [30] B. Christophers, "Taking renewables to market: Prospects for the after-subsidy energy transition: The 2021 Antipode RGS-IBG Lecture," *Antipode*, vol. 54, no. 5, pp. 1519-1544, 2022. <https://doi.org/10.1111/anti.12847>
- [31] S. A. Qadir, H. Al-Motairi, F. Tahir, and L. Al-Fagih, "Incentives and strategies for financing the renewable energy transition: A review," *Energy Reports*, vol. 7, pp. 3590-3606, 2021. <https://doi.org/10.1016/j.egy.2021.06.041>
- [32] K. Bastini, R. Kerschreiter, M. Lachmann, M. Ziegler, and T. Sawert, "Encouraging individual contributions to net-zero organizations: Effects of behavioral policy interventions and social norms," *Journal of Business Ethics*, vol. 192, no. 3, pp. 543-560, 2024. <https://doi.org/10.1007/s10551-023-05516-8>
- [33] A. E. E. Sobaih, A. Hasanein, H. Gharbi, and A. E. Abu Elnasr, "Going green together: Effects of green transformational leadership on employee green behaviour and environmental performance in the Saudi food industry," *Agriculture*, vol. 12, no. 8, p. 1100, 2022. <https://doi.org/10.3390/agriculture12081100>
- [34] A. E. E. Sobaih, H. Gharbi, A. M. Hasanein, and A. E. A. Elnasr, "The mediating effects of green innovation and corporate social responsibility on the link between transformational leadership and performance: An examination using SEM analysis," *Mathematics*, vol. 10, no. 15, p. 2685, 2022. <https://doi.org/10.3390/math10152685>
- [35] B. Michoud, M. Hafner, B. Michoud, and M. Hafner, "Public policies and initiatives in the energy sector," *Financing Clean Energy Access in Sub-Saharan Africa: Risk Mitigation Strategies and Innovative Financing Structures*, pp. 57-82, 2021. https://doi.org/10.1007/978-3-030-75829-5_4
- [36] N. Van Quaquebeke, M. Salem, M. van Dijke, and R. Wenzel, "Conducting organizational survey and experimental research online: From convenient to ambitious in study designs, recruiting, and data quality," *Organizational Psychology Review*, vol. 12, no. 3, pp. 268-305, 2022. <https://doi.org/10.1177/20413866221097571>
- [37] A. E. E. Sobaih, M. Algezawy, and I. A. Elshaer, "Adopting an extended theory of planned behaviour to examine buying intention and behaviour of nutrition-labelled menu for healthy food choices in quick service restaurants: does the culture of consumers really matter?," *International Journal of Environmental Research and Public Health*, vol. 20, no. 5, p. 4498, 2023. <https://doi.org/10.3390/ijerph20054498>
- [38] J. Tetra Pak. (2024). *Global research reveals: 64% of Saudi based consumers are concerned about the environment, pollution & food waste*. Lund, Sweden: Tetra Pak, 2024.

- [39] H. Abu-Bakar and T. Almutairi, "Integrating sustainability and circular economy into consumer-brand dynamics: A Saudi Arabia perspective," *Sustainability*, vol. 16, no. 18, p. 7890, 2024. <https://doi.org/10.3390/su16187890>
- [40] M. Alyahya, M. Aliedan, G. Agag, and Z. H. Abdelmoety, "Exploring the link between sustainable development practices, institutional pressures, and green innovation," *Sustainability*, vol. 14, no. 21, p. 14312, 2022. <https://doi.org/10.3390/su142114312>
- [41] M. A. Khan, A. E. E. Sobaih, K. Lee, and I. Ha, "Cultural differences and McDonald's: A multi-country comparative study," *International Journal of Business and Globalisation*, vol. 31, no. 4, pp. 391-411, 2022. <https://doi.org/10.1504/IJBG.2022.127123>
- [42] Y. Wang, D. Wang, L. Yu, and J. Mao, "What really influences the development of renewable energy? A systematic review and meta-analysis," *Environmental Science and Pollution Research*, vol. 30, no. 22, pp. 62213-62236, 2023. <https://doi.org/10.1007/s11356-023-26286-w>
- [43] M. Akhtaruzzaman, A. K. Banerjee, and S. Boubaker, "Government intervention and green innovation in renewable energy," *Energy Economics*, vol. 145, p. 108185, 2025. <https://doi.org/10.1016/j.eneco.2025.108185>
- [44] N. O. T. Soyombo, N. O. G. Odunaiya, N. K. M. Abioye, and N. a. G. Adeleke, "SME collaboration models for accelerating clean energy innovations: Insights from emerging market economies," *International Journal of Management & Entrepreneurship Research*, vol. 6, no. 9, pp. 3134–3149, 2024. <https://doi.org/10.51594/ijmer.v6i9.1584>
- [45] Y. Bhatt, "Renewable energy deployment to stimulate energy transition in the gulf cooperation council," *Renewable Energy Transition in Asia: Policies, Markets and Emerging Issues*, pp. 161-183, 2021. https://doi.org/10.1007/978-981-15-8905-8_8
- [46] R. A. Almasri and S. Narayan, "A recent review of energy efficiency and renewable energy in the gulf Cooperation council (GCC) region," *International Journal of Green Energy*, vol. 18, no. 14, pp. 1441-1468, 2021. <https://doi.org/10.1080/15435075.2021.1904941>