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The Influence of Consumers' Purchase Intention Factors on Willingness to Pay for Renewable Energy; Mediating Effect of Attitude

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Low market adoption has been a real challenge to Pakistan`s renewable energy growth. This research investigated the factors that influence the intention to use renewable energy in Pakistan. This research was conducted to examine the influences of renewable energy and marketing factors on purchase intention through attitude. It analyzed seven concepts: social media exposure, relative advantage, ease of use, awareness, cost, attitude, and purchase intention and deliberated their relationships. The conceptual framework is based on the theory of planned behavior and the unified theory of acceptance. The primary purpose of this study is to examine the influence of (social media exposure, relative advantage, ease of use, awareness, and cost) on purchase intention with the indirect effect of attitude. Proposed hypotheses have been tested using structured questionnaires through SPSS (AMOS) based on a sample of 497 respondents from Pakistan. Structural equation modeling technique was used to analyze the studied variables' relationships (social media exposure, relative advantage, ease of use, and ease of use, awareness, and cost) and attitude with purchase intention. Study findings show that attitude has a major mediating effect on the relationship between purchase intention and (social media exposure, relative advantage, ease of use, awareness, and cost). The main findings revealed interesting consumer purchase intention regarding renewable energy technology. The results showed a significant positive relationship between influential determinants (social media exposure, relative advantage, ease of use, awareness, and cost) and purchase intention towards the use of renewable energy technology. This study suggests that these marketing approaches can be used as a brand marketing strategy to enhance customer purchase intention. The study's findings will help in making decision in the renewable energy sub-sector. Furthermore, the findings of this study could be used as a reference by the government when making decisions about renewable energy deployment.

Keywords: social media, relative advantage, ease of use, awareness, cost, attitude, purchase intention

1 INTRODUCTION

The widespread usage of fossil fuels has caused many environmental issues, including environmental disruption and degradation (Irfan et al., 2020). Climate change is another phenomenon that harms human existence and the environment (Handmer and Dovers, 2013). In recent years, political and economic discussions have focused on environmental issues and climate change (Grafakos et al., 2020). The utilization of renewable energy in Pakistan is in a developing stage; individuals are more concerned about social norms, the environment, and the advantages of utilizing renewable energy generation technologies (RETs) as renewable energy knowledge grows (Irfan et al., 2021a). In general, attitudes are essential predictors of pro-environmental behavior, such as renewable energy (Yorkovsky and Zysberg, 2021). However, the technology acceptance model identifies attitude as a mediator between purchase intention and renewable energy components towards the utilization of renewable energy. In light of the foregoing and the findings of studies such as those by Patil et al. (2020), we attempted to investigate the role of attitude as a mediator in the relationship of the Unified theory of acceptance and use of technology (UTAUT) principal components with the behavior intention of the consumer.

Increasing demand for electricity utilization with the possibility of depleting fossil fuels has contributed to the need to rapidly grow renewable energy sources (REs) to satisfy consumer demand (Woldeyohannes et al., 2016). Nonetheless, the global energy consumption of these energy sources remains at a minimum level (Painuly, 2001; Rezaei and Ghofranfarid, 2018). This can be said to be right about the developing countries with a large energy market; there seems to be low acceptance for consumers' renewable energy sources. Due to the rapid proliferation in population and economic growth, electricity consumption has risen enormously (Chen and Sivakumar, 2021). Many developing countries still use fossil fuels to generate electricity, including Pakistan. However, fossil fuels cannot be dependent as a prime energy source because of their high cost and adverse environmental impacts (Iqbal et al., 2018). Governments are trying to solve the current energy crisis and track the existing ecological and economic situation by finding economic and sustainable sources (Merino-Rodríguez et al., 2019). The conventional forms of energy generation to renewable sources are due to the need of the public and regulatory authorities for producing and consuming renewable energy (Ikram et al., 2020).

Several national policies were introduced to promote optimal utilization of Pakistan's energy resources (conventional and renewable), for sustainable development. Such included the National Energy Policy (Kamran and Reviews, 2018). Recently, there has been an increase in renewable energy installations across various world countries at least at a small scale level (Murshed et al., 2020). However, Pakistan electricity consumers have low acceptance of green energy, thus investigating the factors that might be responsible for to enhance the consumption of renewable energy (Irfan et al., 2021a). Pakistan has participated in global movements against climate change; therefore, research into consumer behavior toward intention to use renewable energy provides valuable insights both locally and internationally. Numerous research attributed the lack of willingness to use small-scale renewable energy for household energy to lack of consumer confidence, lack of adequate policy, low public awareness, prices, financing constraints, low community acceptance, lack of skilled human resources, weak technology dissemination strategies (Devine-Wright, 2007; Painuly, 2001; Sesan, 2008; Wüstenhagen et al., 2007). While attitude on the intention to use renewable energy have been well studied in developed countries but neglected in developing countries (Irfan et al., 2021a). In particular, the results of studies conducted in the industrialized world cannot be effectively generalized to developing nations (Dewan and Kraemer, 2000) due to their very different social, cultural, economic, political, and legal contexts (Spanos et al, 2002). Many scholars have worked on the Pakistan renewable energy market (Solangi et al., 2021). Some consider the consumer perception of renewable energy technologies while others extensively researched the potentials, policies, constraints, and current status of the generation capacities. Increasing demand for electricity utilization with the possibility of depleting fossil fuels has contributed to the need to rapidly grow renewable energy sources (renewable energy technologies) to satisfy consumer demand. Few types of research have concentrated on the individual point of view on renewable energy in Pakistan. Recently, no detailed research has targeted the households, their socio-economic perceptions (income level), and intention to purchase RE technologies. There are few studies on the motivational reasons behind the intention to purchase, and actual demand remains very low. So the major factors affecting people's intention to use RE are not fully evaluated in Pakistan.

Many factors affected the market of Pakistan's renewable energy. Authors have mentioned policy constraints, financial cost, technical and institutional problems, infrastructure, human capacity, etc. According to (Irfan et al., 2021a), substantial financial investment; inadequate infrastructure, technology, less research and innovation, lack of power purchase agreements, inadequate environmental support and public awareness are some significant barriers to renewable energy fast growth and use in Pakistan**.** However, Pakistan is a developing state and is not known especially for its support for RE due to many obstacles like economic, political, technical, and social barriers (Irfan et al., 2020). The nation relies largely on electricity supply from fossil fuels. The national economy can't fulfill the demand by the expensive electricity generation of manufactured fossil fuels from other countries. So there are severe energy shortages in Pakistan.

These considerations may differ among technologies or nations. This research focuses on different aspects in Pakistan and tries to evaluate the intention to adopt renewable energy. The issue imposed is, "What variables drive customers' RE buying intention in Pakistan?" Thus, the study explores characteristics that explain customer propensity to acquire RE technology. This study claims that variables impacting intention to acquire RE technology and results will benefit stakeholders. Few studies have

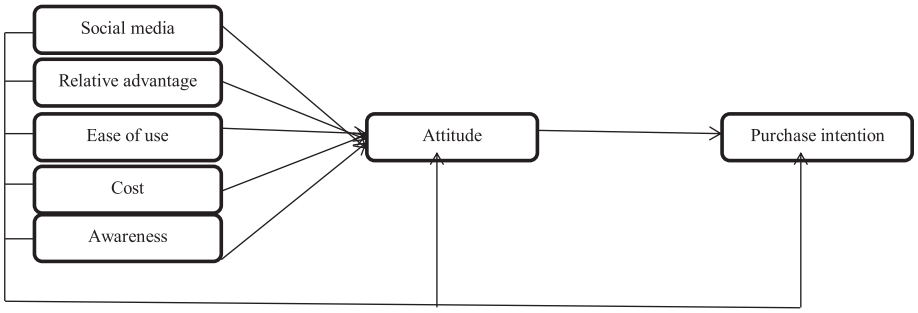

FIGURE 1 | The conceptual framework is based on a survey of the literature. The research found that social media, relative advantage, ease of use, cost and awareness will influence purchase intention with the indirect effect of attitude. This study considers that social media, relative advantage, ease of use, cost and awareness also directly impact consumer attitude. These components have radically altered attitude towards purchase intention.

emphasized the individual's perspective on RE in Pakistan. Recently, no extensive research has addressed the households, their socio-economic attitudes (income level), and intention to acquire RE technology. So, Pakistan's primary elements impacting people's intention to use RE are not thoroughly investigated. Furthermore, effective evaluation of the desire to acquire RE technology assists stakeholders when making investment decisions and designing goods and market strategies. For testing, parameters such as social media exposure, relative benefit, cost, subjective norms, ease of use, awareness, attitude, and purchase intention were used. Because developing nations must understand the processes involved in the move from conventional to renewable energy, this research focuses on elements and theories essential to pre-purchase intention to utilize renewable energy.

The rest of the study is structured as follows. **Section 2** presents the literature review that supports the hypotheses' construction and is followed by **Section 3**, where methodological procedures are detailed. Results are presented in **Section 4**. The paper ends with the discussion and conclusion section, followed by the cited references.

2 LITERATURE REVIEW

2.1 Supportive Theories

These studies have generated important exploratory themes. The theory of planned behavior helps construct initial consumer behavior models, but it doesn't go in-depth into all the possible influences. The unified theory of acceptance and use of technology (UTAUT) is applied in adopting renewable energy technologies in the new environmental area (Aggarwal, 2020). Various researchers and analysts have suggested that many hypotheses analyze customer behavior intention and identify the socio-economic variables that influence purchasing intention in the current era (Rezaei and Ghofranfarid, 2018). But according to the study by Rezaei et al. (2018), one of the most significant theories is a unified theory of acceptance and use of technology (UTAUT), which has been applied in many research fields. The main aspects of the advanced UTAUT theory involve behavioral intention, perceived behavioral control, relative advantages, awareness, and attitude as the most significant driver of individual behavior (Claudy et al, 2013). Researchers have studied consumer intentions to use renewable energy technologies in developing countries in recent years. This idea is how people are aware of current technologies, their latest advantages, and disadvantages, and how to utilize them. The most destructive factor of using technology is a lack of knowledge; a lack of knowledge makes it far more difficult to accept new technology (Alam et al., 2014).

Researchers have studied consumer intentions to use renewable energy technologies in developing countries in recent years. Hosseini et al. (2018) used the theory of planned behavior to evaluate consumer intentions to develop RE technologies in different nations. Alam et al. (2014) discovered that the intention to use renewable energy (RE) is affected by perceptions of behavioral control, ease of use, relative advantage, cost, and consumer awareness. Vand et al. (2019) surveyed Chinese customers to assess their attitudes toward renewable energy (RE). The study's findings suggest that low awareness and low-income levels provide severe barriers to the use of renewable energy (RE). Düştegör et al. (2015) conducted a study in Saudi Arabia and found that financial incentives and government subsidy programmes are the most motivating factors in renewable energy (RE) adoption. Pakistan's renewable energy programme has recently received little research attention towards using RETs. According to Irfan et al. (2021b), Pakistan faces a severe energy crisis, which can be solved by off-grid solar power. Wang et al. (2020) used multiple sources of renewable energy (RE) to supplement fossil fuel generation in the country. The authors found that wind, solar, and biomass energy had great opportunities to utilize energy.

2.2 Research Model and Hypothesis Development

Researchers agreed that the adoption of any given technology is heavily affected by many multidimensional variables, including economic, social, and regulatory aspects (Wolsink M. 2020). Due to the high cost of the technology, the lengthy payback time, and the social effects, it has become increasingly challenging to deploy RETs. Numerous studies have used the TPB framework to

investigate the impact of various variables on behavior, and these studies recognize that this model is appropriate and logical (Elhoushy S. and El-Said, O. A. 2020). The global energy consumption of these energy sources remains at a minimum level (Woldeyohannes et al., 2016). The findings of many studies have shown community acceptance as a critical concern for the growth of RES (Wolsink M. 2020). In other words, the development of renewable energy sources is not just dependent on their economic and technological support. Due to the rapid proliferation in population and economic growth, electricity consumption has risen enormously (Murshed et al., 2020). Many developing countries still use fossil fuels to generate electricity, including Pakistan. However, because of their high cost and negative environmental impacts, fossil fuels cannot be used as a primary energy source (Iqbal et al., 2018). Governments are trying to solve the current energy crisis and track the existing ecological and economic situation by finding economic and sustainable sources (Merino Rodríguez et al., 2019). The conversion of conventional forms of energy generation to renewable sources is due to the need of the public and regulatory authorities to produce and consume renewable energy (Ikram et al., 2020).

This model recognized the appropriateness and robustness of TPB for evaluating consumer intention to utilize RETs in Pakistan. Environmental concerns may be seen as being conscious of ecological degradation for customers. The cost is the total price for consumers to buy the technology, and awareness refers to how consumers know the RETs and their advantages. Including these contexts allows us to make the framework sufficiently broad to study the variables that may play an important role in influencing the intention of consumers to use RETs.

2.3 Hypotheses

2.3.1 Social Media Exposure

Social media is a web-based tool that enables people to develop, reproduce, and exchange information (Laitinen and Sivunen 2020). Social media plays a significant role in sharing information from one person to another. Companies are trying to use social media to engage with their consumers about products (Chopra et al., 2020). The authors found that social media has enormous potential to raise awareness and increase purchases of sustainable products. Marketing researchers stated that social media channels are helpful to facilitate customers' brand connections (Erkan and Evans, 2016). Erlangga, H. (2021) discovered that social media messaging boosts consumer enthusiasm to buy products. In contrast, social media interactions directly impact consumers' purchase decisions towards renewable energy technology (Wang et al., 2020). Consumer attitudes, perceptions, and purchase decisions are all influenced by social media in each stage of the purchasing process (Pop et al., 2021). The social media activities of consumers have a favorable influence on pro-environmental behaviors such as the reduction, reuse, and recycling of waste materials (Trang et al., 2019). RE is more likely to be trusted by consumers through regular and pleasant social media experiences (Sun et al., 2020). Most scholars feel that social media has played an essential role in the overall flow of purchase intentions (Taillon et al., 2020). The quantity and nature of media coverage of environmental disasters and conflicts have made many concerns a significant societal issue. Therefore, Mazis and Raymond (1997) stated that advertisers use various mediums to communicate product benefits to the target audience. Social media advertisements can be used to deliver detailed information and create a brand image, and product packaging may be utilized to attract consumers at the point of sale (Voorveld et al., 2018). Different social media channels are often coordinated into one integrated promotion. However, Liwafa and Utami (2021) explained that social media exposure allows understanding or perceiving an advertising message towards clients through specific media channels. Social media exposure is an important driving force for innovation dissemination and impacts innovators (Zhang et al., 2021). The strongest influence on the flow of social media exposure is that it conveys innovative knowledge quickly to a broad population (Sohn and Kim, 2020). Based on the previous work, media exposure can be argued as an essential predictor of purchasing intention. Therefore.

H1: Social media exposure has a positive effect on the purchase intention.

2.3.2 Relative Advantage

The extent to which an inventive technology is considered to be superior to those that occurred before it or its closest alternative is referred to as relative advantage (Gkartzonikas and Gkritza, 2019). Consumers acknowledge the usage of renewable energies and other socio-economic, environmental benefits (Irfan et al., 2021a). The limited penetration of RE might be attributed to its low relative advantage and accessible power sources in several world regions. According to the evidence, the intention is an excellent predictor of renewable energy purchase behavior and an important component in analyzing people's actual purchasing activity (Rezaei and Ghofranfarid, 2018). The consumer's behavioral intention of adoption relates to their desire to utilize a potential goods or services. This research aims to better recognize customers' behavioral intentions to use renewable energy. Several variables can influence buy intention as a dependent variable, described as the mind's capacity to behave in a specific way to make a purchase (Kusumawati and Mangkoedihardjo 2021). The examined factors include relative advantage effects on purchasing intention attitudes. The constructs selected for the study were taken from the theories mentioned above and were supposed to impact purchasing intention. Furthermore, a previous study revealed a relative benefit that directly impacts the buying intention to utilize RE. Relative advantage directly impacts the attitude, which acts as a mediator in the interaction with intention (Rezaei and Ghofranfarid, 2018; Esa and Zahari, 2016). This research, therefore, argues that:

H2: The relative advantage has a positive effect on customer's purchase intention.

2.3.3 Perceived Ease of Use

The degree to which a technology is supposed to be challenging to use is measured by perceived ease of use (Moslehpour et al., 2018). According to Chen et al. (2020), perceived ease of use is an individual's belief in the ability of an individual component to be simple to use (Tahar et al., 2020). Energy sources are relatively simple, inexpensive, and have a more significant market

perception. Researchers revealed that renewable energy, such as solar energy, has several technological challenges that consumers must overcome (Adenle, 2020). Renewable energy installations, use, maintenance, and technicalities influence public perception. Renewable energy solutions that are easy to install, user-friendly, family-friendly, and comparable to living standards are more likely to influence adoption intention (Ashinze et al., 2021).

H3: Perceived ease of use has a significant positive effect on the customer's purchase intention.

2.3.4 Cost

Renewable energy costs include maintenance, installation and the opportunity cost of implementing RE (Ashinze et al., 2021). According to research, costs were also a significant factor in reducing the adoption and integration of renewable energy solutions, mainly in emerging nations with relatively low incomes (Barnett-Howell et al., 2021). It is primarily a fact that the minimum capital necessary for installing renewable energy is greater than the minimum required by conventional energy. Previous research found a direct and significant relationship between cost and technology adoption (Sarker et al., 2020). According to Irfan et al. (2021a), the consumer perception of renewable energy benefits was demonstrated by three primary outcomes: energy savings, environmental benefits, and the independence of conventional power sources. The customer's impression of product cost depends on the person's social development and financial expertise (Kumar et al., 2020). The current research will provide insights into the perceived cost of renewable energy and its impact on client purchasing intentions. This study now provides insight into perceived costs and their effect on consumer intention.

H4: Cost has a positive effect on the customer purchase intention.

2.3.5 Awareness

The extent to which customers are aware of current technology, its benefits, and drawbacks and can keep up with new developing technological updates is defined as awareness (Waris et al., 2020). The term of awareness refers to the ability of prospective consumers to obtain appropriate information about RE's fundamental usage, economic prospects, and environmental implications (Kumar et al., 2020). One key element of UTAUT that directly impacts the behavioral desire to utilize renewable energy sources is awareness (Kardooni and Ghofranfarid, 2018). A higher degree of awareness is likely to boost the acceptance of RE technologies among new users (Mirza et al., 2009). Awareness is a key component in the choice of customers to acquire new technologies. Numerous research found that knowledge of the consumer's desire to utilize renewable energy sources was beneficial (Alam et al., 2014). Furthermore, green energy knowledge encourages clients to develop a good perception of RE marketing and enhance their purchase incentive to prevent ecological threats (McEachern et al., 2005).

H5: Awareness has a positive effect on the customer purchase intention.

2.3.6 Attitude

Attitude is a person's positive or negative feelings about performing the target behavior (Ashinze et al., 2021). Attitude is an essential component of the theory of planned behavior which refers to assessing a person's behavior as favorable or unfavorable (Amoako et al., 2020). Consumer attitudes may be seen as favorable or negative emotions towards the usage of RETs. The origins of these good or negative emotions may be based on their anticipated environmental, economic, or social consequences and advantages. Attitude (ATT) is a key part of the TPB, which assesses an individual's behavior as favorable or unfavorable (Hamid and Ban, 2021). Attitude can be seen as positive or negative customer opinions regarding the use of RETs. The existing literature demonstrates that attitude is closely linked with the intention of RETs.

Moreover, Najar and Hamid Rather (2021) validated a favorable link between behavior and the intentions of customers to buy energy-efficient household equipment. The attitude was also favorably linked to the consumer's energy reduction intentions (Ali et al., 2021). They also showed the favorable impact of attitudes on the intention of consumers to buy RET. Existing research indicates that the mindset is favorably linked to the intention of customers to use RETs. Consumers think that green energy helps avoid global warming and climate harm lowers our dependence on conventional power and improves air quality (Suraya et al., 2020). Some researchers suggested that attitude is a strong predictor of household power consumption (Chen and Aklikokou, 2020). Numerous studies have confirmed a favorable connection between attitude and customers' willingness to buy energy-efficient home equipment. The attitude has also been shown to be favorably linked to consumer energy reduction intentions (Ali, 2021), showing that this mindset strongly affects the intention of customers to buy energy-efficient goods. This study further explained the concept by examining the mediator's role as a link between variables such as relative advantage, subjective norm; ease of use and awareness as well as the cost and intention to use in the framework of an ideal model, this study hopes to learn more about this topic.

H6: Attitude has a positive effect on purchase intention.

H7: Attitude moderates the relationship between purchase intention and social media exposure.

H8: Attitude moderates the relationship between purchase intention and cost.

H9: Attitude moderates the relationship between purchase intention and relative advantage.

H10: Attitude moderates the relationship between purchases intention and awareness.

H11: Attitude moderates the relationship between purchase intention and ease of use.

2.4 Conceptual Framework

On based of **Figure 1**, the conceptual framework is based on a survey of the literature. The research found that social media, relative advantage, ease of use, cost and awareness will influence purchase intention with the indirect effect of attitude. This study considers that social media, relative advantage, ease of use, cost and awareness also directly impact consumer attitude. These components have radically altered attitude towards purchase intention.

TABLE 1 | Demographic characteristics.

Variable	Category	Frequency	Percentage
Gender	Male	387	77.9
	Female	110	22.1
Age (Years)	20–30	237	47.7
	31–40	82	16.5
	41–50	60	12
	51–60	76	15.3
	61-above	42	8.5
Qualification	Bachelors	245	49.3
	Masters	96	19.3
	Postgraduates	75	15.1
	Diplomas	56	11.3
	Others	25	5.0
Income	1–10,000	26	5.2
	10,000–20,000	59	11.9
	20,000–30,000	83	16.7
	30,000–40,000	197	39.6
	40,000-above	132	26.6

3 METHODOLOGY

3.1 Sample Selection and Collection

This section discusses the methodology, including sample selection and description, data collection, regression model, data analysis, and this is also used to apply statistical tests for testing the hypothesis. The main focus of our current study is to measure "A multidimensional model of renewable energy: Linking purchase intentions, attitude, and user behavior." To achieve the objectives of the study, the planned strategy is to explore the respondents' views towards social media exposure, relative advantage, awareness, perceived ease of use, and attitude. After eliminating questionnaires with error, a total number of 497 respondents was used and analyzed with using statistical software SPSS (Amos). We used the non-probability convenience sampling technique. One of the main advantages of this sampling strategy is that it permitted researchers to collect data from a large number of participants in a very short space of time (Comrey A., and Lee H. 1992). Primary data was collected from the respondents from different Punjab, Pakistan. The hypothesis is measured based upon a scale used by (Roberts and Ko, 2005) in their study. Advertisement is the key instrument of the marketing field, which drives the consumer's probability, understanding, tendency, and selection and effectively promotes and sells the product and services. The customers' attitude towards the purchase intention is measured by the factors of RE., which have an influential impact on consumers' purchase intention. The constructed scale of consumer purchase intention is based on (Baker and Churchill's, 1977), which is used to assess the physical attractiveness of models in promotion as well as the customer's intent to purchase goods.

The usefulness of this research hugely depends on the efficiency of data collection and analysis. (Raykov and Marcoulides, 2006), stated that multicollinearity consistency can easily provide unstable estimates of regression coefficients. IBM SPSS is employed to test for multicollinearity between independent variables. A list of measured items and the sources of each part are presented separately in a table. A coding operation was undertaken at this stage, through which the categories of data are transformed into symbols that were tabulated and counted. Collected data will be coded and modeled using AMOS/SPSS Software.

The hypothesized relationship among observed variables is estimated based on the structural model-direct model and mediation model for testing the indirect effect in the second process. This presented two structural models used for analysis. "Bootstrapping" is qualitative research that includes an estimation of the importance of the indirect impact and meaning of the point estimate. The "Test of mediation" gives two estimates of the indirect effect and tests their ranges but quantifies confidence intervals for the point estimates (Mallinckrodt et al., 2006).

The demographic characteristics of the sample are given in **Table 1** and discussed as follows. Most participants were men (n = 497, 77.9%), with Baker and Churchill's, 1977 an age distribution between 20 and 30 years old (47.7%). In the case of educational background, most individuals reported a bachelor's degree (245, 49.3%). In total, 197 participants (39.6%) specified that their monthly income was between 30,000 and 40,000 rupees.

4 DATA ANALYSIS

4.1 Findings

Different statistical approaches were used for data analysis. The structural equations modeling (SEM) technique was used to analyze the data. SEM can be used to evaluate the connection between variables. Anderson and Gerbing (1988) suggested that the SEM method consists of two stages (measuring model and the structural model). In the measuring model, the researcher verified every latent variable to estimate the structural model by doing confirmatory factor analysis (CFA). For the present study, latent variables were analyzed to ascertain the statistical relation between the seven variables. Stephens and Sommer (1996) recommended that the loading factor of all items should not be less than .50. The results of the CFA contributed to the model's modification. With the results of SEM, the researcher inspected the relationship with latent variables because it indicates the direct or indirect influence of the latent variable on other latent variables. The anticipated linkages between these variables are explicitly specified in the SEM. In SEM, the researcher is enabled to know what was stated and what facts were presented in the proposed model (Hair et al., 1995). The greater the link between proposed relationships and data patterns, the better they show a good fit between model and data. The estimation procedure helps to assess whether or not the suggested model fits the data. Decisions concerning the modification to be raised also depend on fit statistics. There are some types of model fit statistics, such as absolute fit indices, incremental fit, comparative fit, and finally parsimony indices. Each model fit statistic consists of several fit indexes where some thumb rules are applied to the minimum score or value to get a good fit (Byrne, 2001).

TABLE 2 | Variables of exploratory factor analysis, descriptive statistics, and confirmatory factor analysis.

Indicator	Measurable variables	Factor loading	CR	AVE	Cα
Social Media	SM1	.955	.974	.925	.973
	SM3	.946			
	SM3	.951			
Relative advantage	RD1	.916	.971	.870	.971
	RD2	.900			
	RD3	.933			
	RD4	.871			
	RD5	.886			
Awareness	AW1	.924	.969	.864	.969
	AW2	.879			
	AW3	.909			
	AW4	.906			
	AW5	.856			
Ease of use	EU1	.905	.946	.813	.945
	EU2	.863			
	EU3	.876			
	EU4	.796			
Cost	CT1	.865	.946	.778	.946
	CT2	.838			
	CT3	.864			
	CT4	.814			
	CT5	.759			
Attitude	AT1	.914	.941	.841	.940
	AT2	.877			
	AT3	.894			
Purchae intention	PI1	.914	.938	.834	.937
	PI2	.908			
	PI3	.855			

SM, social media; CT, cost; RD, relative advantage; AW, awareness; EU, ease of use; AT, Attitude; PT, purchase intention.

The availability of alternative fit indices caused several challenges for the evaluation process (Kline, 2012). As pointed out by Kenny and McCoach (2003), there is no consistent standard measure in model evaluations; they endorsed the root mean square approximation error (RMSEA), the comparative fit index (CFI), and Tucker-Lewis coefficient (TLI). Bentler's (1990) suggested fit indices are TLI, Incremental fit index (IFI), and Fan et al. (1999) supported RMSEA, TLI, and CFI to be fit indicators. Since it is unlikely that all fit measures can be samples, these fit indices are used for reporting the quality of the two models in the current study. Keep the common fit indexes, and the root mean square fit error (RMSEA), the incremental fit index (IFI), the Tucker-Lewis coefficient (TLI), and the comparative fit index were used for confirming and supporting the proposed model (CFI). For RMSEA, the value should be less than .06 to a closer model, which would be best if the value is equal to. 08. Meanwhile, if the value exceeds .01, it shows that the model does not fit well (Hu and Bentler, 1999). For IFI, the values closer to one show a good fit (Bollen, 1989), and values greater than .90 would be good for TLI and CFI (Hair et al., 1995). In the second step, structural equation modeling was used to test the statistical relationships between independent variables (social media exposure, relative advantage, awareness, cost, and perceived ease of use) and the dependent variable (purchase intention). In the third phase, we checked the statistical link of the mediating variable (attitude) between the independent and dependent variables.

4.2 Measurement Instruments

This research used a quantitative approach to analyze customers' perceptions about factors of renewable energy and its effect on attitude and purchase intention. The study assessed six variables that measure the purchase intention of renewable energy technology and consumers' experiences. The questionnaire considered all research variables and a five-point Likert scale. The first construct is renewable energy. According to the research of (Wu et al., 2018), renewable energy is operationalized into five dimensions: Eighteen items of factors of renewable energy were classified into five dimensions (social media exposure, relative advantage, perceived ease of use, awareness, and cost). Due to poor factor loading, I deleted one item of social media exposure and one item of cost. A total of sixteen items were considered. Four items of mediating variable (attitude) and three items of purchase intention were selected. However, due to poor factor loading of one item, I deleted one item, and overall two items are considered for purchase intention.

Moreover, **Table 2** shows the detailed measurement items, including Cronbach's alpha, average variance extracted (AVE),

TABLE 3 | Discriminant validity of the constructs.

	Purchase intention	Social media	Relative advantage	Cost	Awareness	Attitude	Ease use
Purchase intention	.913						
Social media	.446	.962					
Relative advantage	.411	.338	.933				
Cost	.326	.323	.385	.882			
Awareness	.299	.241	.334	.419	.929		
Attitude	.457	.498	.356	.080	.137	.917	
Ease use	.256	.243	.164	.186	.163	.234	.902

TABLE 4 | Path analysis Regression Weights: (Group number 1 - Default model).

	—	—	Estimate	S.E.	C.R.	*p*	Decision
Attitude	<---	Social media	.442	.033	10.832	***	Accepted
Attitude	<---	Relative advantage	.259	.036	6.204	***	Accepted
Attitude	<---	Cost	–.186	.036	–4.260	***	Accepted
Attitude	<---	Awareness	.003	.030	.069	.945	Not Accepted
Attitude	<---	Ease use	.118	.034	3.089	.002	Accepted
Purchase intention	<---	Social media	.171	.042	3.869	***	Accepted
Purchase intention	<---	Relative advantage	.159	.041	3.780	***	Accepted
Purchase intention	<---	Cost	.130	.041	3.013	.003	Accepted
Purchase intention	<---	Awareness	.099	.034	2.476	.013	Not Accepted
Purchase intention	<---	Ease use	.085	.039	2.262	.024	Accepted
Purchase intention	<---	Attitude	.271	.051	6.094	***	Accepted

****This symbol mean our hypothesis are accepted on base of threshold.*

and composite reliability (CR) for all research variables. According to the outcomes shown in **Table 2**, the CR of every construct varies from .938 to .974, showing that all indicators are under the recommended level. Furthermore, the values of the AVE confirmed the constructs' validity by more than .5 (Kao and Hung, 2008; Kao and Lin, 2016). AVE values ranged from .778 up to .925, which indicates that the average explanatory power of the variables used in this study was satisfactory and it is appropriate for advanced analysis. The convergent validity of each estimation item was tested using factor loadings, and the values of all measures are between 0.796 and 0.955, which exceeds the benchmark value of 0.5. (Hair et al., 1995, 2010).

Finally, this statistical measurement was tested with a confidence interval (CI) and Percentile 90% CI through the software (Amos). To satisfy the discriminant validity criteria, the square root of a construct's AVE must be greater than the correlations between the component and the others in the research (Fornell and Larcker, 1981). The diagonal items in **Table 3** are the square root values of AVEs, while the other components are Pearson correlation coefficients between the variables. As a result, the measurement's discriminant validity is satisfactory.

4.3 Structure Equation Model

The proposed direct, indirect, and mediating hypotheses were statistically tested with the structural equation model (SEM) using the Amos software. Basically, SEM provides the complete direction and consideration of the proposed hypothetical model and also provides accuracy without any incorrect standard error estimations. First, we checked the direct effects of independent variables (social media exposure, relative advantage, awareness, cost, and perceived ease of use) on the dependent variable (purchase intention) with path analysis in the table. We also used the bootstrap of 1,000 samples to check the indirect effect (Gunzler et al., 2013) of attitude between the independent variables (social media exposure, relative advantage, awareness, cost, and perceived ease of use) and dependent variable (purchase intention).

According to the findings of **Table 4**, Five dimensions of renewable energy are considered to check the statistical relation, (social media exposure (β = .171 p < .001), relative advantage (β = .159, p < .001), ease of use (β = .085, p < .001), and cost (β = .130, p < .001) have positive significant influence on purchase intention, while (awareness (β = .099, p < .001), has no any positive significant effect on purchase intention. Moreover, the second direct effects of social media exposure (β = .442 p < .001), relative advantage (β = .259, p < .001), ease of use (β = .118, p < .001), and cost (β = -.186, p < .001) have positive significant effect on attitude while (awareness (β = .003, p < .001), has no any positive significant effect on attitude. On the other hand, the mediating variable (attitude (β = 0.271, p < .001) also has a statistically significant positive direct effect on purchase intention.

4.4 The Direct and Indirect Effects

The mediated hypotheses propose that factors of renewable energy (social media exposure, relative advantage, awareness, cost, and ease of use) indirectly impact purchase intention through attitude. Estimated results of **Table 5** illustrated that attitude (β = 0.271, p < .001) has a significant positive impact on purchase intention, so it is proven that there exists a mediation between (social media exposure, relative benefits, consciousness,

TABLE 5 | Direct, indirect, and total effect.

	Ease use	Awareness	Cost	Relative advantage	Social media	Attitude	Purchase Intention
Direct effect							
Attitude	.118	.003	−.186	.259	.442	.000	.000
Purchase intention	.085	.099	.130	.159	.171	.271	.000
Indirect effect							
purchase intention	.032	.001	−.050	.070	.120	.000	.000
Total effect							
purchase intention<	.117	.100	.080	.229	.291	.271	.000

cost, perceived ease of use) and purchase intention through attitude. The empirical outcomes supported the above assumption, indicating that attitude would affect purchase intention. Additionally, this study demonstrated that attitude mediates the relations between (social media exposure and ease of use) and purchase intention, while attitude has no mediating effect between relative advantage, awareness, and cost) and purchase intention. Therefore, green companies should focus on renewable energy channels to enhance their consumer attitude to raise their purchase intention to satisfy their customer's environmental needs.

5 DISCUSSION

This research is designed to check the significance of RE as a sustainable source of clean energy and its components on the one hand, and the attitude that mediates the relationship between (social media exposure, relative advantage, awareness, perceived ease of use, and cost) and purchase intention on the other hand. The main objective of this study is to investigate the multidimensional factors that affect renewable purchase intention. According to the consequences of result of H1, there is a significant direct relationship between social media exposure and purchase intention (Lee et al.,. 2021). So, the perceived value of social media advertising is severely impacted by intrusiveness and privacy concerns about the use of renewable energy (Arora and Agarwal, 2019). In accordance with the findings of H2, there is also an optimistic direct relation between the relative advantage and purchase intention. As a result, the more significant perceived comparative advantage of renewable energy accelerates the adoption of renewable energy. However, past research has confirmed the concept that relative advantage directly influences purchase intention, and these results are supported by the study (Rezaei and Ghofranfarid, 2018). With the results of H3, there is also a significant direct connection between perceived ease of use and the purchase intention of RE. Individuals in Pakistan have strong ideas about accepting renewable energy, which may exchange from one person to another, but further qualitative research is needed to understand this dynamic. This study supports studies (Irfan et al., 2021a; Waris et al., 2020). The indirect results supported and verified how easy it is to use renewable energy significantly impacted the purchase intention through attitude. These outcomes align with the study (Liobikienė et al., 2021). Hence, my results support a significant effect of perceived ease of use and purchase intention. These results relatively matched with previous results. The Pakistani respondents felt that this technology was simple to use, maintain, and comprehend.

The results of hypothesis four verified this theory (Aggarwal, 2020). The study found a positive correlation between how much an organization's employees think RE costs and their attitudes regarding purchasing and using RE. If the cost of the product increases, it diversely affects purchase intention because consumers always want to decrease the cost of any product. So a product's perceived cost is crucial to uptake. While the result of H5 revealed no significant direct relationship between awareness and purchase intention, These consequences align with the studies (Rezaei et al., 2018; Liobikienė et al., 2021). As established by the initial factors, and as evident from the resultant findings, the relationship between intentions to use and determinants (social media exposure, relative advantage, ease of use, cost, and awareness) of renewable energy did not have a significant positive impact on purchase intention. In contrast, with the indirect effect of attitude, some factors (perceived ease of use and social media exposure) positively affected purchase intention. As a rule, the model's predictive capacity is boosted significantly when the attitude component's presence as a mediating variable is factored in. Attitude is a crucial mediator between renewable energy determinants and purchase intention. The idea that attitude is a substantial mediating factor in the relationship between renewable energy determinants and purchase intention was proven by hypotheses H6, H7, H8, H9, and H10. In simpler terms, if the citizens of Pakistan feel better about their attitude, then their motivation to use energy sources improves. This helps to boost consumer interest in RE. As a result, increasing people's interest in renewable energy sources should be possible through reinforcing their beliefs in the efficacy of RE.

6 MANAGERIAL IMPLICATIONS

With a deep focus on exploring the factors of renewable energy (RE) on consumer purchase intention, the current research provides practical implications for organizations, stakeholders, and government policymakers. The study has provided light on the effects that impact the purchase of sustainable renewable energy (Masukujjaman et al., 2021). Managers and policymakers may use these findings to provide suggestions to enhance renewable energy through renewable energy components (Wang et al., 2020). This study improves the relationships of

renewable energy sources (REs) between all renewable energy (RE)-related components and influences consumer purchases towards renewable energy. This energy sector deeply affects the economy of Pakistan (Abbasi, et al., 2020). So the investment in renewable energy (RE) is accumulating in Pakistan, which will help with falling costs and technological advancements in fulfilling consumer demand. Thus, renewable energy (RE) companies should improve their working techniques to protect the environment and focus on consumer demands. To do this, a company should simplify its transactions, payments, and credit allocation methods to minimize its energy consumption. To improve this attribute, a renewable energy (RE) company should focus on marketing factors (social media exposure and ease of use) to enhance consumers' intention towards renewable energy (RE). To that end, organizers should raise awareness of the factors determining optimal usage to stimulate young people's interest in renewable energy. These awareness efforts should also stress the framework used and provided in this research to understand better the links examined here and their implications for business management. Helping the environment with renewable energy, which was the study's primary goal, may assist in creating significant changes in economic growth and a better community.

7 CONCLUSION, LIMITATIONS AND FUTURE RESEARCH

This research aims to analyze individual intentions to use renewable energy in Pakistan based on numerous psychological models, theories, and comprehensive frameworks. The study found that people are more likely to choose renewable energy if they have a positive opinion about it and plan to buy it. My research model consists of a multidimensional model with five independent variables (social media exposure, relative advantage, awareness, cost, and perceived ease of use), one mediating variable (attitude) to check the effect of these variables on one dependent variable (purchase intention) towards the use of renewable energy technology. This study extended the theory of planned behavior to completely assess the aspects that influence public acceptance and use of the RE, which is this study's significant contribution. The study findings reveal interesting discoveries that have major policy considerations and practical ideas for decision-making. Social media exposure does not help with the convenience of use or their level of awareness towards the use of renewable energy technology. Customers' purchase intention is a critical predictor of RE's intentions to follow through with the behavior. Several advantages of the proposed strategy are obvious to those who examine the usage of renewable energy in Pakistan. These approaches provide new insights and understanding of renewable energy in Pakistan. The study also provides valuable information for policymakers to aid them in expanding the use of renewable energy in rural areas.

Despite the fact that the research findings are consistent with theoretical expectations, the present study has limitations. Firstly, a limited sample size was selected, which has an impact on the generalizability of the results. So it is necessary for the next researcher to use sample size more than 500 to get a proper findings. Second, the data was gathered in general but did not take into account the country's rural and urban parts. In urban and rural areas, socioeconomic characteristics such as awareness, income, and education may vary. Future studies should address this restriction by doing research in the countryside. This important component may be taken into account in future research to enhance the current body of knowledge from a Pakistan viewpoint. Finally, a number of variables influence the RE sector; nevertheless, only the most important ones were examined. This limitation may be addressed by evaluating the effect of other potential variables such as risk perception, confidence in RETs, and moral responsibilities.

There are various limitations to this study, as well as potential areas for further research. The renewable energy technology sector is still in its early stages and faces several challenges, and the first is that the demand for renewable energy is increasing quickly. The environmental impact of renewable energy technology is still a topic of discussion. This article cannot critically examine renewable energy technology aspects, but consumer responses may be affected due to intense public discussions over it. Future research should concentrate on renewable energy technology's ecological performance measured by Life Cycle Assessment (LCA) studies. Then these studies' findings can be applied to future consumer research. For example, future research might consider the number of improved renewable energy technologies that customers find appealing. Furthermore, while technological advances will help reduce costs in the near future, renewable energy technology is now supplied at greater prices than its potential competitors. Studies have looked at whether or not consumers are ready to pay a higher for product lines that have environmental benefits. The results show that they are, even though the exact increase depends mainly on customer characteristics (Stigka et al., 2014), product purchase frequency (Morone et al., 2021), and consumers' overall price sensitivity (Niedermeier et al., 2021). Future studies could produce a more thorough evaluation of consumers' desire to pay for renewable energy technology. Renewable energy technology features depend on product and brand, qualities, and distinct consumer characteristics.

Furthermore, the capacity of attitudes and intention to purchase predict actual conduct is questionable, especially in environmental behavior (Papista and Krystallis, 2013). There's also an inconsistency between what people say they're willing to spend and what they end up paying (Barber et al., 2012). Future research should investigate if consumers are willing to buy different types of renewable energy technology in a real-life situation (i.e. field experiment) and add more objective behavioral data (e.g. utilizing real purchase data) to make the results more robust and generalizable. Future studies could concentrate on demographic differences between nations and how these affect the evaluation of renewable energy technologies. And also, it would be great to look deeper into specific nation demographics or cultural aspects that influence how consumers evaluate renewable energy products and possibly

shed light on why some countries receive renewable energy products better than others.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusion of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by School of Economics and Management, Jiangsu University of Science and Technology, Zhenjiang, China. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

AUTHOR CONTRIBUTIONS

Conceptualization, JT; methodology, MN; software, MN; validation, MN and MN; formal analysis, MN; investigation MN; data curation, Meharb Nazir; writing—original draft preparation, MN; writing—review and editing, JT and MN.; supervision, JT; funding acquisition, JT.

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