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Acceptance of Solar Technology by Farmers in Vietnam

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ABSTRACT

This study aims to explain the acceptance of solar technology by farmers in Vietnam. The study combines the Theory of Planned Behavior (TPB) and the Technology Acceptance Model (TAM), supplemented with additional factors (concern for the environment, trust in technology, and supporting policies) to address the research objectives. The study uses quota sampling to collect data from 248 farmers in 4 provinces (Hau Giang, Dong Thap, Bac Lieu, and Kien Giang) in the Mekong Delta region, Vietnam. By applying the Structural Equation Modeling (SEM) approach, the research results demonstrated the positive influences of various factors on the intention to use solar technology among farmers, including perceived ease of use, perceived usefulness, subjective norms, attitude, perceived behavioral control, concern for the environment, trust in technology, and supporting policies. Among these factors, trust in technology was found to have the most impact on the intention to use solar technology among farmers in Vietnam.

Keywords: Intention to Use, Solar Technology, Farmer, Theory of Planned Behavior, Technology Acceptance Model
JEL Classifications: E21, E70, Q47

1. INTRODUCTION

The increasing demand for energy consumption and the risk of fossil fuel depletion has led to the rapid development of renewable energy sources (Rezaei and Ghofranfarid, 2018). Renewable energy can meet two-thirds of the world's total energy needs, helping to reduce greenhouse gas emissions by 2050 to maintain the global average surface temperature (Held et al., 2019; Kiprop et al., 2019). Unlike other energy sources that exist only in certain countries, renewable energy sources are available everywhere across various geographical regions. Developing renewable energy systems is seen as an effective solution to ensure energy security, minimize environmental pollution, and promote sustainable development (Viet et al., 2022).

With economic development and a growing population, energy consumption needs in Vietnam are increasing. Therefore, the use of energy-saving and efficient solutions is crucial (Duong et al., 2022). Vietnam is known to have great potential for clean energy sources (Hoi, 2020). As a latecomer, Vietnam has only recently paid significant attention to the development of renewable energy. Among these, solar power has emerged as a new development trend and is increasingly playing an essential role in Vietnam's energy structure. Solar energy is an unlimited sustainable energy source (Jirakiattikul et al., 2021). Moreover, solar energy is suitable for all regions, especially in the southern and central highlands of Vietnam (Polo et al., 2015). In recent times, despite maximizing electricity sources, Vietnam is facing the risk of power shortages, especially from 2021 to 2025 (Tuan, 2020). The development of solar power projects plays a crucial role in providing and supplementing electricity supply to the energy system in the context of electricity scarcity, contributing to ensuring energy security.

In recent times, the acceptance of solar technology has attracted the attention of scientists. Many studies have been conducted on various aspects of solar power utilization, such as economic feasibility, policy barriers, promotion of solar power development, and the role of communication in different countries worldwide

(Khalid and Junaidi, 2013; Wang et al., 2017). However, most studies have focused on assessing the current status and potential development of the solar power market, without exploring the needs and technology acceptance of customers (Viet et al., 2022). This is especially important for customers in rural areas, particularly agricultural producers, who represent a significant market segment in Vietnam. To succeed in the policy development of solar technology in rural areas, the acceptance of solar technology by farmers matters. This study continues to build upon the Theory of Planned Behavior (TPB) and the Technology Acceptance Model (TAM) to demonstrate the factors influencing the intention to use solar power among farmers in Vietnam.

2. THEORETICAL FRAMEWORK AND RESEARCH HYPOTHESES

2.1. Theoretical Framework

Determining the factors that influence the acceptance of a new technological model and predicting market acceptance or rejection is crucial for the success or failure of a technology system. This has led many experts in various countries around the world to diligently research and develop theoretical models of technology acceptance (Hop, 2019).

The Theory of Reasoned Action (TRA) is a research model based on social psychology perspectives aimed at identifying factors of conscious behavioral trends (Douglass, 1977; Ajzen, 1980). The Theory of Planned Behavior (TPB), developed by (Ajzen, 1985; 1991), is an extension of the original TRA theory, incorporating the additional factor of perceived behavioral control. TPB predicts intention based on three main factors: attitude, subjective norms, and perceived behavioral control. The Technology Acceptance Model (TAM) is based on the foundation of the TRA theory and establishes relationships between variables to explain human behavior regarding the acceptance and use of information systems (Davis, 1989; 1993). The factors in the TAM model, specifically perceived usefulness, perceived ease of use, and attitude, represent attributes or characteristics of the system (Davis, 1989). In the present time, TAM is widely used in various fields to explore users' behavioral intentions in accepting and adopting new technologies.

2.2. Renewable Energy and Solar Power

Renewable energy is a wide and scientifically oriented concept that is currently understood in various ways. Renewable energy is often referred to as "clean energy" from continuous sources that, according to human standards, are infinite, such as solar energy, wind, rain, tides, waves, and geothermal energy (Wall et al., 2021; Trifonov et al., 2021).

Solar energy is the radiation energy produced by the sun. It is the first energy source discovered, exploited, and utilized on Earth. Solar energy possesses the potential to fully meet the world's energy needs in cases where technology and supply sources are available (Blaschke et al., 2013). Solar power is the process of converting sunlight into electrical energy through the photovoltaic effect (Lorenzo, 1994). Solar power involves capturing the energy from sunlight and converting it into electricity (Thakur et al., 2018; Markvart, 2000).

2.3. Intention to Use

Intention is a factor used to assess an individual's ability to perform a behavior. According to Ajzen (1991), intention is a motivating factor that reflects an individual's readiness to engage in a specific behavior. Intention is a goal-oriented process that an individual desires to achieve (Zhao and Othman, 2010). According to Tirtiroglu and Elbeck (2008), usage intention describes a customer's willingness to use a particular product. Usage intention represents an individual's inclination, indicating whether they will use a new technology or not. Usage intention is considered a predictor of an individual's likelihood to accept and use technology (Shanmugam et al., 2014). Intention to use technology can be understood as technology acceptance (Holden and Karsh, 2010).

2.4. Research Hypotheses

An overview of the literature reveals that the topic of technology acceptance, particularly in the context of renewable energy

Table 1: Factors affecting the adoption of renewable energy

Factor	Author/group of authors
Perceived ease of use/effort expectancy	Alam et al. (2014), Kardooni et al. (2016), Wojuola and Alant (2017), Waheed Iqbal et al. (2018), Adepoju and Akinwale (2019), Ayoub et al. (2019), Ali et al. (2020), Bandara and Amarasena (2020), Ashinze et al. (2021), Do Huy and Nguyen (2022), Nazir and Tian (2022)
Perceived usefulness/ performance expectancy	Saleh et al. (2014), Kardooni et al. (2016), Wojuola and Alant (2017), Waheed Iqbal et al. (2018), Adepoju and Akinwale (2019), Aggarwal et al. (2019), Ayoub et al. (2019), Masukujjaman et al. (2021), Wall et al. (2021), Do Huy and Nguyen (2022), Rahmani and Naeini (2023).
Subjective norms	Feng (2012), Havas et al. (2015), Yun and Lee (2015), Adepoju and Akinwale (2019), Abreu et al. (2019), Ashinze et al. (2021), Masrahi et al. (2021), Poier (2021), Tanveer et al. (2021), Zulu et al. (2021), Than et al. (2022), Asif et al. (2023).
Perceived behavioral control	Kaiser et al. (2005), Wang et al. (2013), Yun and Lee (2015), Abreu et al. (2019), Bandara and Amarasena (2020), Bekti et al. (2021), Than et al. (2022), Asif et al. (2023), Fathima et al. (2023).
Attitude	Park and Ohm (2014), Yun and Lee (2015), Kardooni et al. (2016), Ayoub et al. (2019), Abreu et al. (2019), Ashinze et al. (2021), Bekti et al. (2021), Lan et al. (2021), Zulu et al. (2021), Wall et al. (2021), Nazir and Tian (2022), Than et al. (2022), Asif et al. (2023), Rahmani and Naeini (2023).
Concern for the environment	Waheed Iqbal et al. (2018), Adepoju and Akinwale (2019), Liem et al. (2020), Ashinze et al. (2021), Lan et al. (2021), Wall et al. (2021), Nazir and Tian (2022), Than et al. (2022), Zeng et al. (2022).
Trust in technology	Adepoju and Akinwale (2019), Tanveer et al. (2021), Wall et al. (2021), Zulu et al. (2021), Asif et al. (2023), Rahmani and Naeini (2023).
Supporting policies	Guta (2018), Adepoju and Akinwale (2019), Malik and Ayop (2020), Sun et al. (2020), Jirakiattikul et al. (2021), Lan et al. (2021), Nhi (2021), Viet et al. (2022).

Source: Authors, 2023

technology and solar energy, has received significant attention from researchers worldwide. The research approaches employed in this field are diverse and encompass various aspects, including (i) the application of technology acceptance theories (TPB, TAM, UTAUT, etc.), (ii) research methods (qualitative, quantitative), (iii) the subjects/objects of technology acceptance (public, businesses, public organizations), and (iv) the geographical scope of the research (local level, national level, cross-country comparisons). The following table summarizes the findings on the influential factors affecting the acceptance of renewable energy technology, especially solar energy technology (Table 1).

Based on the theoretical foundation and literature review regarding the factors influencing the acceptance of renewable energy technology, the study proposes the following hypotheses: H1: Perceived ease of use positively influences the intention to use solar energy technology among farmers; H2: Perceived usefulness positively affects the intention to use solar energy technology among farmers; H3: Subjective norms positively impacts the intention to use solar energy technology among farmers; H4: Perceived behavioral control positively influences the intention to use solar energy technology among farmers; H5: Attitude positively influences the intention to use solar energy technology among farmers; H6: Concern for the environment positively impacts the intention to use solar energy technology among farmers; H7: Trust in technology positively affetcs the intention to use solar energy technology among farmers; H8: Supporting policies positively influence the intention to use solar energy technology among farmers.

Based on these research hypotheses, the model for the model "Factors influencing the intention to use solar energy technology among farmers in Vietnam" (Figure 1) is established as follows:

3. RESEARCH METHODOLOGY

Research using a combination of qualitative and quantitative methods. The research process is carried out in the following sequence: (i) Qualitative research, (ii) Preliminary quantitative research, and (iii) Formal quantitative research.

In the qualitative research phase: The study conducts group interviews and consults with experts to refine and improve the question content as well as construct the measurement system. The group discussion method is implemented with the participation of 12 farmers in Hau Giang Province (Mekong Delta region, Vietnam). Simultaneously, the study consults with 5 experts in renewable energy. The results of the group interviews and expert consultations have unified the research measurements (Table 2). These measurement scales are adjusted from qualitative research to be more suitable in the research context.

In the preliminary quantitative research phase: The preliminary quantitative research is conducted with a sample size of n=105, equivalent to 105 surveyed questionnaires, using convenient sampling. The research team conducts direct interviews with farmers in Hau Giang and Kien Giang Provinces in the Mekong Delta region. The reliability test of the measurement scale and exploratory factor analysis are used to evaluate the preliminary survey data. The results of the preliminary quantitative research phase will help refine the measurement scales before conducting the formal quantitative research.

In the formal quantitative research phase: quantitative analysis methods used to test the research hypotheses include the Reliability test of the measurement scale using Cronbach's alpha, exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and structural equation modeling (SEM).

Regarding the survey sample, for the use of exploratory factor analysis (EFA), the minimum sample size should be 50, preferably 100, and the appropriate observation-to-measurement variable ratio is 5:1 (Hair et al., 2010). To ensure reliability in conducting the SEM model, a sample size of 100 to 200 is required (Hoyle, 1995). However, a reasonable sample size should reach a minimum of 200 observations for the SEM model to be stable (Hoelter, 1983; Kline, 2011). The formal survey is conducted in 4 provinces (Hau Giang, Dong Thap, Bac Lieu, and Kien Giang) in the Mekong Delta region. The survey took place from October 2022 to November 2022. Quota sampling is used to collect data. The total number of survey responses is 255, after excluding inappropriate surveys (incomplete answers, unreliable responses), a total of 248 valid survey responses are used to test the research model.

4. RESEARCH RESULTS AND DISCUSSION

4.1. Research Results

4.1.1. Test scale reliability

Testing the reliability of the scale to evaluate the relationship among observed variables in the same scale and help eliminate the garbage variables that can form spurious factors (Churchill, 1979). Based on Table 3, the results of the reliability test for the factors are satisfactory, with Cronbach's alpha values for all scales exceeding 0.8 (Hair et al., 2017) and the corrected item-total correlation all exceeding 0.3 (Nunnally and Bernstein, 1994). This indicates that no observed variables are excluded from the research model (Nunnally, 1978; Peterson, 1994; Slater, 1995). This demonstrates that all measurement scales ensure internal consistency and reliability.

Exploratory factor analysis (EFA) is performed once on all observed variables using the promax rotation method. The overall model fit is evaluated, resulting in a KMO value of 0.915 ($\geq$0.5), and Bartlett's test with a significance level of Sig. = 0.000 ($\leq$0.05), indicating that the data is suitable for the EFA method. The total variance extracted reaches 74.719% ($\geq$50%), and the eigenvalue is 1.020 (>1.0) (Hair et al., 1998), indicating that the data is capable of forming 9 factors. Regarding the convergent validity, the factor loading value of each observed variable is >0.5, showing that all variables are important and practically meaningful (Hair et al., 1998). As for discriminant validity, the difference in factor loading value of an observed variable across factors is >0.3 (Hair et al., 1998). Therefore, the results confirm the formation of 9 factors with 36 observed variables, ensuring both convergent and discriminant validity of the measurement scales.

Table 2: Interpretation of observed variables in the research model

Factor	Observed variable	Scale
Perceived ease of use	PEU1: Solar energy technology is not difficult to learn how to use	Likert 1-5
	PEU2: No effort is required to understand and use solar energy technology	Likert 1-5
	PEU3: Solar energy technology is easy to install and repair	Likert 1-5
	PEU4: I easily become proficient in using solar energy technology	Likert 1-5
	Reference resources: Alam et al. (2014), Ali et al. (2020)	
Perceived usefulness	PU1: Solar energy technology helps save electricity usage costs	Likert 1-5
	PU2: Solar energy technology well meets living needs	Likert 1-5
	PU3: Solar energy technology helps improve the quality of life	Likert 1-5
	PU4: In general, solar energy technology is useful	Likert 1-5
	Reference resources: Ali et al. (2020), Tanveer et al. (2021)	
Subjective norms	SN1: My friends advise me to use solar energy technology	Likert 1-5
	SN2: My neighbors encourage me to use solar energy technology	Likert 1-5
	SN3: People that are important to me advise me to use solar energy technology	Likert 1-5
	SN4: Using solar energy technology is a trend in the community	Likert 1-5
	Reference resources: Tanveer et al. (2021), Asif et al. (2023)	
Perceived behavioral control	PBC1: I have full authority to invest in solar energy technology	Likert 1-5
	PBC2: I have adequate information and knowledge about solar energy technology	Likert 1-5
	PBC3: I have the necessary resources to invest in solar energy technology	Likert 1-5
	PBC4: I believe that using solar energy technology contributes positively to the environment	Likert 1-5
	Reference resources: Irfan et al. (2020), Asif et al. (2023)	
Attitude	AT1: I have a positive attitude toward solar energy technology	Likert 1-5
	AT2: Solar energy is better than other conventional electricity	Likert 1-5
	AT3: Using solar energy technology is an intelligent solution	Likert 1-5
	AT4: Using solar energy technology to protect the environment	Likert 1-5
	Reference resources: Ali et al. (2020), Asif et al. (2023)	
Concern for the environment	CTE1: I worry about the increasingly serious environmental pollution	Likert 1-5
	CTE2: I worry about environmental issues caused by energy sources	Likert 1-5
	CTE3: I worry about climate change and related hazardous impacts	Likert 1-5
	CTE4: The use of renewable energy can improve the environment	Likert 1-5
	Reference resources: Irfan et al. (2020), Wall et al. (2021)	
Trust in technology	TT1: Solar energy technology is more reliable than other energy technologies	Likert 1-5
	TT2: I am confident that legal and technological structures will support me in the face of solar energy technology problems	Likert 1-5
	TT3: I am sure that solar technology will meet my needs	Likert 1-5
	TT4: Solar energy usage can improve the energy infrastructure	Likert 1-5
	Reference resources: Rahmani and Naeini (2023), Asif et al. (2023)	
Supporting policies	SP1: The government will create favorable conditions for people to access and use solar energy technology	Likert 1-5
	SP2: The government's policies attract my interest and participation in solar energy technology	Likert 1-5
	SP3: The government's communication campaign on solar energy technology has garnered positive attention from the public	Likert 1-5
	SP4: I trust that the government's supporting policies will be implemented in the long term	Likert 1-5
	Reference resources: Ali et al. (2020), Sun et al. (2020)	
Intention to use	IU1: I intend to install solar energy technology in the future	Likert 1-5
	IU2: Energy-saving behavior motivates me to use solar energy technology	Likert 1-5
	IU3: I would like to spend more on solar energy technology rather than other sources of energy	Likert 1-5
	IU4: I will encourage those around me to use solar energy technology for a better future	Likert 1-5
	Reference resources: Wall et al. (2021), Asif et al. (2023)	

After a preliminary assessment using EFA and Cronbach's alpha, the factors will be reconfirmed using the confirmatory factor analysis (CFA) method. The CFA result points out that the model is highly compatible with the market data, as evidenced by the following indices: Adjusted Chi-square value divided by degrees of freedom - CMIN/df=1.411≤2 (Carmines and McIver, 1981); Tucker and Lewis index - TLI = 0.951 ≥0.9; Comparative Fit Index - CFI = 0.959 ≥0.90; Root Mean Square Error of Approximation - RMSEA is 0.041 ≤0.08 (Bentler and Bonett, 1980; Anderson and Gerbing, 1988; Steiger, 1990). The result demonstrates that all measurement scales meet the requirements for convergent validity, reliability, and discriminant validity.

Convergent value: A measurement scale is considered to have convergent validity when the standardized regression weight is >0.5 and statistically significant (Hair et al., 2010). Additionally, another criterion to test convergence is the average variance extracted (AVE). Fornell and Larcker (1981) suggested that to achieve convergent validity, AVE should be above 0.5. Based on the analysis results in Table 4, all standardized and unstandardized values are >0.5, and the AVE values are also >0.5. Thus, it can be concluded that the factors achieve convergent validity.

Composite reliability and average variance extracted: The examination result indicates that the factors have unidimensionality and meet the requirements for composite reliability (CR) (>50%) (Jöreskog, 1971) and average variance extracted for each factor (>50%).

Discriminant validity: Based on the result of the correlation coefficients among factors, all correlation coefficients are <1.0 and statistically significant (at a significance level of 1%). Therefore, the examined factors achieve discriminant validity (Steenkamp and Van Trijp, 1991).

4.2. Test Research Hypotheses

The structural equation modeling (SEM) was conducted using the Maximum Likelihood method with 8 structural models and a correlation matrix comprising 36 observed variables. The result of the SEM shows that the research model is appropriate for the market data. This is evidenced by the following result indices: Chi-square divided by degrees of freedom (Chi-square/df) = 1.383 (≤3); TLI=0.956 (≥0.9); CFI=0.962 (≥0.9); RMSEA=0.039 (≤0.08) (Carmines and McIver, 1981; Anderson Gerbing, 1988). These results demonstrate that the research model is consistent with the market data. Based on the findings presented in Table 5, all research hypotheses are accepted at a significance level of 5%.

Table 3: Test scale reliability

Factor	Sign	Cronbach's alpha	Factor loading	Mean	SD
Perceived ease of use	PEU1	0.887	0.695	3.649	1.042
	PEU2		0.897	3.729	1.043
	PEU3		0.797	3.725	1.052
	PEU4		0.812	3.621	1.022
Perceived usefulness	PU1	0.881	0.771	3.592	0.985
	PU2		0.886	3.705	0.980
	PU3		0.818	3.645	1.050
	PU4		0.668	3.625	0.965
Subjective norms	SN1	0.902	0.818	3.423	0.990
	SN2		0.794	3.407	0.993
	SN3		0.777	3.504	0.989
	SN4		0.872	3.350	0.982
Perceived behavioral control	PBC1	0.900	0.819	3.596	0.938
	PBC2		0.866	3.532	0.890
	PBC3		0.785	3.520	0.939
	PBC4		0.828	3.536	0.876
Attitude	AT1	0.904	0.907	3.237	0.950
	AT2		0.774	3.189	0.913
	AT3		0.826	2.979	0.888
	AT4		0.814	3.274	0.889
Concern for the environment	CTE1	0.840	0.752	3.616	0.786
	CTE2		0.741	3.568	0.850
	CTE3		0.777	3.637	0.837
	CTE4		0.759	3.576	0.791
Trust in technology	TT1	0.848	0.748	3.645	1.023
	TT2		0.716	3.641	1.032
	TT3		0.705	3.697	1.010
	TT4		0.786	3.754	1.049
Supporting policies	SP1	0.870	0.798	3.616	0.986
	SP2		0.808	3.467	0.993
	SP3		0.711	3.645	0.953
	SP4		0.738	3.596	0.980
Intention to use	IU1	0.861	0.693	3.552	1.059
	IU2		0.713	3.496	1.010
	IU3		0.739	3.512	0.997
	IU4		0.542	3.564	1.047

SD: Standard deviation, Source: Authors, 2023

5. DISCUSSION

The research findings have demonstrated that perceived ease of use positively influences the intention to use solar technology among farmers. This indicates that if solar technology becomes easier to install, use, and repair, the intention to use it among farmers will increase. Indeed, consumers are more likely to adopt renewable energy sources if they are simple, easy to install and use, particularly without any assistance from technical experts (Alam and Rashid, 2012; Waheed Iqbal et al., 2018). Additionally, the study has shown a positive correlation between perceived usefulness and the intention to use solar technology among farmers. In other words, when farmers perceive the benefits of solar technology, their intention to use it will be higher. The research results further confirm that when users perceive technologies as useful, they are more likely to have a positive attitude and a tendency to use them (Ali et al., 2020; Asif et al., 2023).

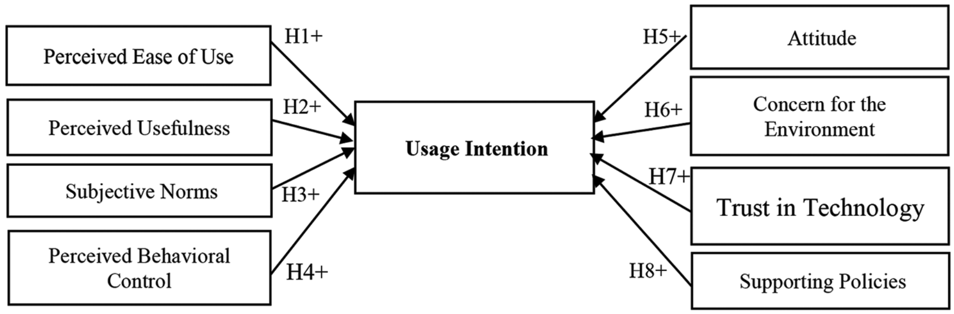
The research has provided evidence that attitude significantly influences the intention to use solar technology among farmers. This indicates that when farmers have a positive attitude towards solar technology, their intention to use it will be higher. Attitude toward technology is the strongest predictor of intention to use technology (Feng, 2012). The research findings also confirm that a positive attitude towards environmental protection has a positive influence on the acceptance of environmentally friendly technology (Greaves et al., 2013; López-Mosquera et al., 2014). Furthermore, subjective norms have a positive impact on the intention to use solar technology among farmers. The research results reflect the characteristics of a consumer market in an emerging economy where individual decisions are heavily influenced by surrounding members (Korcaj et al., 2015). In the Vietnamese market, these research findings are consistent with the study proposed by Than

Table 4: Correlation among variables in the research model

Factor	CR	AVE	Standardized regression weights (λ_i)								
			AT	PBC	PU	SN	CTE	TT	SP	PEU	IU
AT	0.905	0.706	0.840								
PBC	0.900	0.692	0.485	0.832							
PU	0.882	0.652	0.285	0.335	0.807						
SN	0.902	0.696	0.208	0.378	0.425	0.834					
CTE	0.840	0.569	0.355	0.408	0.294	0.357	0.754				
TT	0.849	0.584	0.344	0.430	0.430	0.559	0.368	0.764			
SP	0.871	0.628	0.282	0.456	0.435	0.617	0.370	0.621	0.792		
PEU	0.888	0.664	0.485	0.378	0.553	0.320	0.330	0.490	0.438	0.815	
IU	0.861	0.608	0.525	0.605	0.572	0.602	0.540	0.677	0.656	0.611	0.780

CR: Composite reliability, AVE: Average variance extracted

Figure 1: Proposed research model



Source: Authors, 2023

Table 5: Test research hypotheses

Hypothesis	Relationship	Standardized estimated value	P	Result
H1	IU ← PEU	0.147	0.028	Accepted
H2	IU ← PU	0.132	0.033	Accepted
H3	IU ← SN	0.152	0.021	Accepted
H4	IU ← PBC	0.164	0.007	Accepted
H5	IU ← AT	0.139	0.017	Accepted
H6	IU ← CTE	0.155	0.006	Accepted
H7	IU ← TT	0.200	0.006	Accepted
H8	IU ← SP	0.146	0.046	Accepted

et al. (2022). Additionally, perceived behavioral control positively influences the intention to use solar technology among farmers. The research findings further emphasize that perceived behavioral control is a crucial factor in predicting an individual's future behavior (Klöckner, 2013; La Barbera and Ajzen, 2020). Perceived behavioral control is identified as a positive factor influencing the intention to purchase energy-saving products and contribute to environmental protection (Kaiser et al., 2005; Nguyen and Hoang, 2022).

As expected, concern for the environment is a factor that promotes the intention to use solar technology among farmers. Previous studies have repeatedly emphasized the positive relationship between concern for the environment and the acceptance of renewable energy technology (Ashinze et al., 2021; Lan et al., 2021; Wall et al., 2021; Nazir and Tian, 2022; Than et al., 2022; Zeng et al., 2022). Furthermore, trust in technology has been proven to be a positive factor influencing the intention to use solar technology among farmers. This research finding is consistent with some studies in the field of renewable technology proposed by Adepoju and Akinwale (2019), Tanveer et al. (2021), Wall et al. (2021), Zulu et al. (2021), Asif et al. (2023), Rahmani and Naeini (2023). An important discovery of this study is the positive impact of supporting policies on the intention to use solar technology among farmers. In developing countries, government support policies significantly influence household solar system investment (Malik and Ayop, 2020). The research finding affirms that government policies are an essential solution for most households to perceive the capability and express an intention to invest in solar energy technology (Guta, 2018).

6. CONCLUSION

This study is one of the pioneering studies in Vietnam that applies the TPB and TAM models to explain the intention to use solar technology among farmers. More importantly, the study has added new factors (concern for the environment, trust in technology, and supporting policies) to explain the acceptance of solar technology among farmers in Vietnam. The effectiveness of combining the TPB and TAM models in explaining the acceptance of solar technology among farmers is demonstrated by establishing a strong relationship among perceived ease of use, perceived usefulness, subjective norms, perceived behavioral control, attitude, and intention to use (Davis, 1989; Ajzen, 1991). The research findings have demonstrated that several factors have a positive effect on the intention to use solar technology among farmers, including perceived ease of use, perceived usefulness, subjective norms, attitude, perceived behavioral control, concern for the environment, trust in technology, and supporting policies. Among them, trust in technology has the most influence on the intention to use solar technology among farmers. The study still has some limitations that need improvement and serve as suggestions for future research. Firstly, the quota sampling and the limited sample size may have affected the significance of the study. Secondly, the explanatory power for the intention to use solar technology by farmers is still limited. The addition of new latent variables such as household characteristics, household resources, weather conditions, and product characteristics is necessary for future studies.

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