International Review of Management and Marketing

ISSN: 2146-4405

available at http: www.econjournals.com

International Review of Management and Marketing, 2027, 17(1), 22-27.

Factors Influencing the Adoption of Solar Energy Systems by Household in Malaysia

Lim Kim Yew[1]*, Hannie Lynn[1], Tan Owee Kowang[2], Lim Shun Hang[2], Goh Chin Fei[2], Ong Choon Hee[3], Samreen Fahim Babar[4], Hu Mei[5]

[1]Faculty of Business and Communications, INTI International University, Nilai, Negeri Sembilan, Malaysia, [2]Faculty of Management, University Teknologi Malaysia, Johor Bahru, Malaysia, [3]Azman Hashim International Business School, Universiti Teknologi Malaysia, Johor Bahru, Malaysia, [4]School of Economics, Quaid-i-Azam University, Islamabad, Pakistan, [5]School of Business, Yinchuan University of Energy, Ningxia, China. *Email: kimyew.lim@newinti.edu.my

Received: 04 May 2026 **Accepted:** 12 August 2026 **DOI:** https://doi.org/10.32479/irmm.24431

ABSTRACT

The growing concern over environmental sustainability and rising energy costs has increased interest in renewable energy adoption particularly solar energy systems (SES). Hence, this study examines the importance factors influencing the adoption of SES among households in Johor Bahru (RO1), investigates the relationships between the factors and adoption of SES (RO2) and assess the differences in SES adoption based on respondent demographic (RO3). This study adopted the motivation-ability-opportunity (MOA) framework and viewed MOA as the key factors influencing SES adoption. The research employed a quantitative approach with the household in Johor Bahru as the target population and a sample size of 68 recommended by Raosoft. A structured questionnaire was distributed using a purposive sampling method and 97 responses were received. Descriptive analysis results reveal that respondents viewed all the three MOA factors are important. Pearson correlation results suggest that motivation, ability, and opportunity are significantly and positively correlated with the SES adoption. Meanwhile, ANOVA results show that there are significant differences in SES adoption based on monthly household income. Overall, the study provides valuable insights into household solar energy adoption and offers practical implications for policymakers, energy providers and stakeholders in supporting Malaysia's renewable energy goals.

Keywords: Solar Energy Adoption, Renewable Energy, Motivation, Ability, Opportunity (MOA) Framework, Household Behaviour
JEL Classifications: M0, M1, M3

1. INTRODUCTION

The growing concern over climate change and the need to reduce dependence on fossil fuels have accelerated the adoption of renewable energy worldwide. Among renewable energy technologies, solar photovoltaic (PV) systems have emerged as a practical and sustainable solution due to their environmental benefits, technological advancement, and decreasing installation costs. In Malaysia, the residential sector plays an important role in supporting national renewable energy targets, as households account for a significant share of electricity consumption (Zhang et al., 2022). However, the adoption of solar energy systems is influenced by various behavioral, financial, and environmental factors rather than economic considerations alone. To examine these factors, this study adopts the motivation-ability-opportunity (MAO) framework. Motivation refers to households' willingness to adopt solar energy, driven by environmental concern, perceived cost savings, and social influence (Palm et al., 2011). Ability represents the financial resources, technical knowledge, and confidence required to install and maintain solar energy systems. Opportunity refers to external conditions that facilitate adoption, including government incentives, policy support, market accessibility, and

This Journal is licensed under a Creative Commons Attribution 4.0 International License

access to reliable information (Sustainable Energy Development Authority Malaysia. (n.d.), 2025).

Guided by the diffusion of innovation theory, this study investigates how these three factors influence household adoption of solar energy systems in Johor Bahru. Specifically, the study aims to identify the important factors influencing solar energy adoption, examine the relationships between these factors and adoption behavior, and determine whether adoption differs across demographic groups. By providing empirical evidence from households in Johor Bahru, the study contributes to the growing body of knowledge on renewable energy adoption and offers practical insights for policymakers and industry stakeholders seeking to promote sustainable energy practices. The research objectives are: (1) to identify the important factors influencing solar energy adoption, (2) to examine the relationship between adoption factors and solar energy adoption, and (3) to examine differences in adoption based on demographic characteristics.

2. LITERATURE REVIEW

2.1. Adoption of Solar Energy System

Adoption of solar energy systems refers to the process by which households actively implement and use solar photovoltaic (PV) technology to generate clean, sustainable electricity. It involves not only the technical installation but also a behavioral and financial commitment influenced by multiple factors, such as perceived reliability, cost-benefit evaluations, and access to information (Sarker et al., 2023). Adoption decisions are shaped by both internal factors, including socio-demographic characteristics and awareness, and external factors, such as financial incentives, institutional support, and policy frameworks (Etongo and Naidu, 2022). At the residential level, adoption reflects a household's deliberate choice to invest in sustainable and independent energy solutions (El-Khozondar and El-Batta, 2022). Adoption is further driven by environmental concerns, economic incentives, and social acceptance, emphasizing that it is a complex process beyond simple technical implementation (Andrade-Arias et al., 2025).

2.2. Factors affecting Adoption of Solar Energy System

The adoption of solar energy systems is influenced by various behavioral, financial, social, and policy-related factors. Previous studies have shown that adoption decisions extend beyond the technical installation of solar panels and involve household motivation, financial capability, and knowledge of solar technology (Faiers et al., 2006). Internal factors such as environmental concern, expected cost savings, and social influence play important roles in encouraging adoption. At the same time, external factors, including government incentives, subsidies, feed-in tariff (FiT) programs, and market accessibility, create favorable conditions for adoption. Socio-economic characteristics, particularly household income, education level, and access to information, also affect consumers' willingness to invest in solar energy systems (Smirnova et al., 2021). Although technological advancements and supportive policies have improved the attractiveness of solar energy, adoption rates remain below expectations due to barriers such as financial constraints, limited awareness, and insufficient technical knowledge (Fauzi et al., 2024). Overall, motivation, ability, and opportunity are the key factors that influence household adoption of solar energy systems (Tee et al., 2024).

2.3. Motivation

Motivation refers to the internal drive that encourages households to adopt solar energy, encompassing personal values, environmental beliefs, and perceived benefits (Malik and Ayop, 2020; Colasante et al., 2022). It is considered a key predictor of adoption, as it shapes the intention to install solar photovoltaic (PV) systems. Motivational factors include reducing electricity bills, contributing to environmental protection, following social norms, and increasing energy independence (Arroyo et al., 2019). In this study, motivation was measured using items such as: "I want to reduce my electricity bills," "I care about the environment," and "I want to be less dependent on traditional electricity sources." Motivation acts as the initial spark for adoption, influencing whether households explore solar energy options. In Johor Bahru, rising electricity costs and increased climate change awareness are key motivational drivers. However, motivation alone is insufficient without the necessary ability and external opportunities to act (Balcombe et al., 2013).

2.4. Opportunity

Opportunity encompasses external factors that facilitate or hinder solar energy adoption, including government incentives, policy support, access to reliable information, and the availability of installation services (Colasante et al., 2022; Shakeel and Rajala, 2020). Opportunity reflects whether the environment supports households in acting on their motivation and capacity (Shakeel et al., 2023). In this study, opportunity was measured with items such as: "I am aware of government incentives for solar energy," "It is easy to find reliable information about solar systems," and "There are enough local companies offering solar installation." Even motivated and capable households may fail to adopt solar energy if the surrounding environment is unsupportive. In Johor Bahru, opportunity is particularly crucial because gaps in awareness, service accessibility, and policy support may limit adoption despite interest and financial readiness (Islam et al., 2014).

2.5. Ability

Ability refers to households' capacity to adopt solar energy systems, including financial, technical, and informational resources (Shakeel and Rajala, 2020; Malik and Ayop, 2020). It represents whether a household can act on its motivation, considering factors such as income, knowledge of solar technology, and understanding of long-term savings (Rai et al., 2012). Ability-related barriers include high upfront costs, insufficient technical knowledge, and limited access to guidance or support. In this study, ability was measured using items such as: "I can afford the cost of installing solar panels," "I have enough knowledge about how solar energy systems work," and "I understand the long-term savings of solar energy." Evaluating ability is crucial in Johor Bahru, where interest in solar energy may exist, but financial and knowledge constraints often delay or prevent adoption (Gloria et al., 2024).

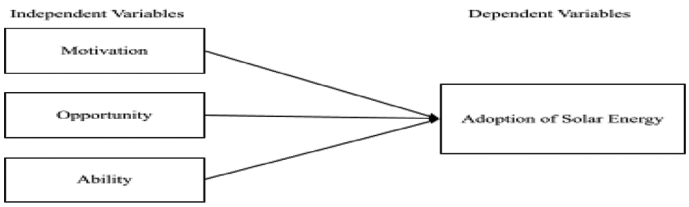
2.6. Underpinning Theory

This study is underpinned by the diffusion of innovation (DOI) Theory proposed by Rogers (1962), which explains how new technologies are adopted over time within a social system. The theory emphasizes that adoption is influenced not only by the

technical attributes of an innovation but also by individuals' perceptions, social influences, communication channels and environmental support (Salkind et al., 2017). DOI identifies key innovation characteristics, relative advantage, compatibility, complexity, trialability and observability as well as stages of adoption and different adopter categories that shape the diffusion process. The DOI theory provides a strong theoretical foundation for integrating the motivation-ability-opportunity (MOA) framework in this study (Sunter et al., 2019). Motivation reflects households' perceived benefits and environmental awareness, ability represents financial capacity and technical knowledge, and opportunity captures external support such as government incentives and access to information. Together, these factors explain household decision-making in adopting solar energy systems. By combining DOI and MOA, this study offers a comprehensive explanation of solar energy adoption behavior at the household level in Johor Bahru (Guta et al., 2018).

2.7. Research Framework and Hypotheses

This study is grounded in the motivation-ability-opportunity (MAO) framework and underpinned by the diffusion of innovation (DOI) theory. The research framework conceptualises solar energy system adoption as the dependent variable influenced by three independent variables: motivation, ability and opportunity.



In line with the research framework, four hypotheses are developed:

- H_1: Motivation has a significant positive relationship with the adoption of solar energy systems among households
- H_2: Ability has a significant positive relationship with the adoption of solar energy systems among households
- H_3: Opportunity has a significant positive relationship with the adoption of solar energy systems among households
- H_{4a}: There is a significant difference in the adoption of solar energy systems based on respondents' gender
- H_{4b}: There is a significant difference in the adoption of solar energy systems based on respondents' age
- H_{4c}: There is a significant difference in the adoption of solar energy systems based on respondents' education level
- H_{4d}: There is a significant difference in the adoption of solar energy systems based on respondents' race
- H_{4e}: There is a significant difference in the adoption of solar energy systems based on household income
- H_{4f}: There is a significant difference in the adoption of solar energy systems based on respondents' type of house.

3. METHODOLOGY

3.1. Population and Sampling

The target population comprised household decision-makers residing in Johor Bahru. The population for this research comprises household residents in Johor Bahru. The required sample size was determined using the Raosoft sample size calculator which is a widely used online tool for estimating appropriate sample size in quantitative studies (Etikan et al., 2016). The calculation was based on a 95% confidence level, 5% margin of error and 50% response distribution which is commonly adopted when the population behavior is a minimum sample size of 68 respondents to ensure adequate representation of the population and the reliability of the statistical analysis (Bell et al., 2022).

3.2. Research Instrument

This study employed a structured questionnaire to collect quantitative data from households in Johor Bahru regarding solar energy adoption. The instrument was developed based on previous literature and guided by the motivation-ability-opportunity (MOA) framework to ensure validity and relevance (Sekaran et al., 2016). The questionnaire consisted of five sections. Section A collected demographic information. Section B measured motivation, including environmental concern, cost savings, energy independence, and renewable energy awareness. Section C assessed Ability, focusing on financial capability, technical knowledge, and affordability. Section D evaluated opportunity, including government incentives, service availability, information accessibility, and institutional support. Section E measured solar energy adoption and future adoption intention (Ishtiaq et al., 2019).

3.3. Analysis Tools

The data collected were analysed using statistical package for the social sciences (SPSS) software. Both descriptive and inferential statistical techniques were employed to address the research objectives. Descriptive analysis was conducted to identify the important factors influencing solar energy adoption among households in Johor Bahru, with mean scores used to determine factor importance. Pearson correlation analysis was performed to examine the relationships between motivation, ability, opportunity, and solar energy adoption (Von Bertalanffy et al., 1968). One-way ANOVA was used to assess differences in solar energy adoption across demographic groups, including age, gender, race, education level, household income, and housing type. All analyses were conducted at a 5% significance level ($P < 0.05$) (Madgley et at., 2000).

4. DATA ANALYSIS

4.1. Demographic Profile

The demographic profile of the respondents provides an overview of the characteristics of the households involved in this study and helps to contextualise the findings on solar energy adoption (Table 1). A total of 97 households from Johor Bahru participated in the survey, representing a diverse range of socio-demographic backgrounds.

The demographic profile of the respondents (n = 97) reflects a diverse sample of households in Johor Bahru. Male respondents accounted for 59%, while females represented 41%. Most respondents were aged 35–44 years (36.1%) and held a degree qualification (55.7%). Chinese respondents formed the largest ethnic group (45.4%), followed by Malays and Indians. The majority reported monthly household incomes between RM5,001

Table 1: Demographic profile of respondent

Demographic background	Classification	Frequency (n=97)	Percentage
Gender	Male	57	59.00
	Female	40	41.00
Age	25-34	26	26.80
	35-44	35	36.10
	45-54	23	23.70
	55 and above	13	13.40
Education level	Secondary	19	19.60
	Diploma	19	19.60
	Degree	54	55.70
	Postgraduate	5	5.10
Race	Malay	32	33.00
	Chinese	44	45.40
	Indian	20	20.60
	Bumiputera	1	1.00
Monthly household income	Below RM3,000	20	20.60
	RM3,001-RM5,000	24	24.70
	RM5,001-RM8,000	35	36.10
	RM 8,000 and above	18	18.60
Type of house	Bungalow	13	13.40
	Semi-detached	13	13.40
	Terrance/Link	59	60.80
	Apartment/Condominium	12	12.40

and RM8,000 (36.1%). Terrace or link houses were the most common housing type (60.8%). Overall, the sample was suitable for examining household solar energy adoption.

4.2. Normality and Reliability Analysis

Normality analysis was performed to examine whether the data met the assumptions required for parametric statistical testing. Table 2 presents the results of the normality analysis for the study variables. The skewness values ranged from −1.108 to −0.433, indicating slight to moderate negative skewness across all constructs (Zikmund et al., 2010). This suggests that respondents generally reported favourable perceptions of solar energy adoption and its influencing factors. The kurtosis values ranged from 0.305 to 2.760, showing that the distributions were relatively normal without extreme peakedness or flatness (Palinkas et al., 2015). Based on commonly accepted guidelines, skewness values within ±2 and kurtosis values within ±3 indicate an acceptable level of normality. All variables satisfied these criteria, demonstrating that the data do not significantly deviate from a normal distribution. Although the Ability construct recorded the highest kurtosis value (2.760), it remained within the acceptable threshold. Overall, the normality analysis confirms that the assumption of normality was not violated, indicating that the dataset is suitable for subsequent parametric statistical analyses, including correlation and ANOVA testing (Lavrakas et al., 2008).

The reliability analysis indicates that all constructs in this study exhibit acceptable to high internal consistency (Table 3). The motivation construct demonstrated satisfactory reliability, while ability showed a high level of reliability, indicating strong consistency among its measurement items. Opportunity also met the acceptable reliability threshold despite having a slightly lower alpha value. The adoption of solar energy system construct displayed strong reliability, confirming consistency across its items. Overall, the results confirm that all measurement scales are reliable and suitable for further statistical analysis.

Table 2: Normality analysis result

Descriptive statistics				
Variables	Skewness		Kurtosis	
	Statistics	Standard error	Statistics	Standard error
Motivation	−0.433	0.245	0.305	0.485
Ability	−1.108	0.245	2.76	0.485
Opportunity	−0.899	0.245	1.716	0.485

Table 3: Reliability analysis result

Reliability statistics			
Variables	Cronbach's Alpha	Cronbach's Alpha based on standardized items	No of items
Motivation	0.77	0.776	4
Ability	0.843	0.842	5
Opportunity	0.75	0.745	4

4.3. Descriptive Analysis for RO1

Research question 1 (RQ1) aims to pinpoint the key factors in the adoption of solar energy systems by households in Johor Bahru. To investigate this question, a questionnaire comprising attributes from Section B is employed and the gathered data is analyzed through descriptive statistics.

Among the MOA constructs, motivation recorded the highest mean score (M = 4.3170, SD = 0.46283), indicating that respondents generally perceived motivation as the most influential factor in solar energy adoption (Table 4). Opportunity followed closely (M = 4.2660, SD = 0.48453), suggesting that respondents perceived favourable external conditions, such as policy support and information accessibility. Ability recorded the lowest mean among the three constructs (M = 4.2186, SD = 0.54243), though it still reflects a high level of agreement. The relatively higher standard deviation indicates greater variability in respondents' perceived financial and technical capability. In line with the 3P guideline, descriptive analysis of the dependent variable (solar energy adoption) was not required (Alabi et al., 2023).

4.4. Pearson Correlation Analysis for RO2

Pearson correlation analysis was performed to examine the strength and direction of the relationships between the independent variables (motivation, ability, and opportunity) and the dependent variable (solar energy system adoption). This analysis provided preliminary evidence regarding the associations among the study variables prior to hypothesis testing (Table 5).

Motivation, ability, and opportunity all have positive and statistically significant relationships with the adoption of solar energy systems ($P < 0.05$), supporting the MOA framework. Motivation demonstrates a moderate positive relationship ($r = 0.445$), indicating that environmentally driven values, social influence, and expected cost savings increase households' likelihood of adoption. Ability exhibits the strongest relationship with solar energy adoption ($r = 0.631$), suggesting that financial readiness, technical knowledge, and decision-making confidence are key determinants. Opportunity also shows a strong positive relationship ($r = 0.623$), highlighting the importance of

external support factors such as government incentives, policy clarity, and information accessibility, in line with Palm and Tengvard (Field et al., 2024).

4.5. ANOVA Analysis for RO3

Inferential statistical analyses were conducted to examine differences in solar energy system adoption based on demographic factors. One-way analysis of variance (ANOVA) was used to test whether significant differences exist in adoption behaviour across different income and education levels (Table 6). Where applicable, independent sample t-tests were employed to compare mean differences between two demographic groups. These analyses enabled the evaluation of demographic effects on adoption behaviour.

The ANOVA results indicate that only monthly household income has a significant effect on the adoption of solar energy systems ($P = 0.001$). No significant differences were found based on gender, age, education level, race and type of house as all corresponding P-values exceeded the 0.05 threshold.

Table 4: Descriptive analysis result

Descriptive statistics		
Factor	**n**	**Mean**
Motivation	97	4.317
Ability	97	4.2186
Opportunity	97	4.266

Table 5: Pearson correlation analysis result

Correlation analysis		
Variables	**Student satisfaction**	
	Pearson correlation coefficient (r)	**Significance level**
Motivation	0.445	0
Ability	0.631	0
Opportunity	0.623	0

Table 6: Anova test analysis result

Hypothesis	Demographic	Significant	Decision
H_{4a}	There is a significant difference in the adoption of solar energy systems based on gender	0.999	Not supported
H_{4b}	There is a significant difference in the adoption of solar energy systems based on age	0.469	Not supported
H_{4c}	There is a significant difference in the adoption of solar energy systems based on respondents' education level.	0.253	Not supported
H_{4d}	There is a significant difference in the adoption of solar energy systems based on race	0.829	Not supported
H_{4e}	There is a significant difference in the adoption of solar energy systems based on monthly household income.	0.001	Supported
H_{4f}	There is a significant difference in the adoption of solar energy systems based on the type of house	0.135	Not supported

5. RESULTS AND DISCUSSION

This section presents and discusses the findings of the study based on the three research objectives. The results provide insights into the factors influencing household adoption of solar energy systems in Johor Bahru and offer empirical support for the motivation-ability-opportunity (MOA) framework.

For Research Question 1, the descriptive analysis showed that respondents generally held positive perceptions toward solar energy adoption. Motivation recorded the highest mean score ($M = 4.3170$), indicating that environmental concern, cost-saving expectations, and social influence are the most important factors encouraging adoption. Opportunity ($M = 4.2660$) and Ability ($M = 4.2186$) also received high mean scores, suggesting that supportive policies, information accessibility, financial capability, and technical knowledge are important considerations. The high mean score for solar energy adoption ($M = 4.3041$) further reflects respondents' strong willingness to adopt solar energy systems.

For research question 2, the correlation analysis revealed significant positive relationships between all MOA factors and solar energy adoption. Ability demonstrated the strongest relationship ($r = 0.631$, $P < 0.001$), followed closely by opportunity ($r = 0.623$, $P < 0.001$), while motivation showed a moderate positive relationship ($r = 0.445$, $P < 0.001$). These findings indicate that financial readiness, technical knowledge, supportive external conditions, and personal motivation all contribute to household adoption decisions.

For research question 3, the demographic analysis indicated that gender, age, race, education level, and housing type did not significantly influence solar energy adoption. However, monthly household income showed a significant effect ($P < 0.05$), suggesting that households with higher income levels are more likely to adopt solar energy systems due to their greater financial capacity. Overall, the findings highlight the importance of economic capability, supportive policies, and household readiness in promoting solar energy adoption in Johor Bahru.

6. CONCLUSION

This study successfully identified the key factors influencing household adoption of solar energy systems in Johor Bahru using the motivation-ability-opportunity (MOA) framework. The findings revealed that motivation, ability, and opportunity all have significant positive effects on solar energy adoption, with ability demonstrating the strongest influence. Household income was also found to be a significant demographic factor affecting adoption decisions. These results highlight the importance of enhancing financial accessibility, technical knowledge, public awareness, and supportive policies to encourage greater adoption of solar energy.

The study contributes to both theory and practice by validating the applicability of the MOA framework in the Malaysian context and providing insights for policymakers and industry stakeholders. However, the findings are limited by the study's relatively small sample size, restricted geographical scope, and cross-sectional design. Future research is recommended to include larger and more diverse samples across different regions, examine additional determinants of solar energy adoption, and employ longitudinal research designs to better understand changes in adoption behaviour over time.

REFERENCES

Alabi, O., Bukola, T. (2023), Introduction to descriptive statistics. In: Recent Advances in Biostatistics. United Kingdom: IntechOpen.

Andrade-Arias, A.S., Kabir, G., Mirmohammadsadeghi, M., Gunasekaran, A., Elizondo-Noriega, A. (2025), Exploring public perspectives on solar energy adoption in Mexico. Renewable and Sustainable Energy Reviews, 212, 115410.

Arroyo, P., Carrete, L. (2019), Motivational drivers for the adoption of green energy: The case of purchasing photovoltaic systems. Management Research Review, 42(5), 542-567.

Balcombe, P., Rigby, D., Azapagic, A. (2013), Motivations and barriers associated with adopting microgeneration energy technologies in the UK. Renewable and Sustainable Energy Reviews, 22, 655-666.

Bell, E., Harley, B., Bryman, A. (2022), Business Research Methods. Oxford University Press. Available from: https://books.google.com.my/books?hl=en&lr=&id=hptjeaaaqbaj&oi=fnd&pg=pp1&dq=bryman,+a.,+%26+bell,+e.+(2015)

Colasante, A., D'Adamo, I., Morone, P. (2022), What drives the solar energy transition? The effect of policies, incentives and behavior in a cross-country comparison. Energy Research and Social Science, 85, 102405.

El-Khozondar, J., El-Batta, F. (2022), Solar energy implementation at the household level: Gaza Strip case study. Energy Sustainability and Society, 12, 65.

Etikan, I., Musa, S.A., Alkassim, R.S. (2016), Comparison of convenience sampling and purposive sampling. American Journal of Theoretical and Applied Statistics, 5(1), 1-4.

Etongo, D., Naidu, H. (2022), Determinants of household adoption of solar energy technology in Seychelles in a context of 100% access to electricity. Discov Sustain 3, 38.

Faiers, A., Neame, C. (2006), Consumer attitudes towards domestic solar power systems. Energy Policy, 34(14), 1797-1806.

Fauzi, N., Ismail, F.Z. (2024), Raising awareness and overcoming challenges: Recommendations for solar photovoltaic (PV) system adoption in residential areas. International Journal of Business and Technology Management, 6(S2), 278-293.

Field, A. (2024), Discovering Statistics Using IBM SPSS Statistics. California: Sage Publications Limited.

Gloria, M. (2024), Tax Relief for Solar Panels in Malaysia. Get Solar. Available from: https://www.getsolar.ai/en-my/blog/tax-relief-solar-panel

Guta, D.D. (2018), Determinants of household adoption of solar energy technology in rural Ethiopia. Journal of Cleaner Production, 204, 193-204.

Ishtiaq, M. (2019), Book Review Creswell, JW (2014), Research Design: Qualitative, Quantitative and Mixed Methods Approaches. Thousand Oaks, CA: Sage. English Language Teaching, 12(5), 40.

Islam, T., Meade, N., Teytelboym, A. (2014), Household solar adoption: The role of house type and ownership. Energy Policy, 65, 257-265.

Lavrakas, P. J. (2008), Encyclopedia of Survey Research Methods. Sage Publications. Available from: https://books.google.com.my/books?hl=en&lr=&id=2sr0caaaqbaj&oi=fnd&pg=pp1&dq=lavrakas

Malik, S.A., Ayop, A.R. (2020), Solar energy technology: Knowledge, awareness, and acceptance of B40 households in one district of Malaysia towards government initiatives. Technology in Society, 63, 101416.

Midgley, G. (2000), Systemic intervention. In: Systemic Intervention: Philosophy, Methodology, and Practice. Boston, MA: Springer. p113-133. Available from: https://link.springer.com/chapter/10.1007/978-1-4615-4201-8_6

Nunnally, J.C. (1978), Psychometric Theory. 2nd ed. Columbus: McGraw-Hill.

Palinkas, L.A., Horwitz, S.M., Green, C.A., Wisdom, J.P., Duan, N., Hoagwood, K. (2015), Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. Administration and Policy in Mental Health and Mental Health Services Research, 42, 533-544.

Palm, J., Tengvard, M. (2011), Motives for and barriers to household adoption of small-scale production of electricity: Examples from Sweden. Sustainability: Science Practice and Policy, 7(1), 6-15.

Rai, V., McAndrews, K. (2012), Decision-Making and Behavior Change in Residential Adopters of Solar PV. In: Proceedings of the World Renewable Energy Forum. p1-6.

Salkind, N.J. (2017), Tests and Measurement for People Who (Think they) Hate Tests and Measurement. California: Sage Publications.

Sarker, M.T., Haram, M.H.S.M., Ramasamy, G., Al Farid, F., Mansor, S. (2023), Solar photovoltaic home systems in Malaysia: A comprehensive review and analysis. Energies, 16(23), 7718.

Sekaran, U. (2016), Research Methods for Business: A Skill Building Approach. United States: John Wiley and Sons.

Shakeel, S.R., Rajala, A. (2020), Factors Influencing Households' Intention to Adopt Solar PV: A Systematic Review. In: Advances in Human Factors, Business Management and Leadership: Proceedings of the AHFE 2020 Virtual Conferences on Human Factors, Business Management and Society, and Human Factors in Management and Leadership. USA: Springer International Publishing. p282-289. Available from: https://link.springer.com/chapter/10.1007/978-3-030-50791-6_36

Shakeel, S.R., Yousaf, H., Irfan, M., Rajala, A. (2023), Solar PV adoption at household level: Insights based on a systematic literature review. Energy Strategy Reviews, 50, 101178.

Smirnova, E., Kot, S., Kolpak, E., Shestak, V. (2021), Governmental support and renewable energy production: A cross-country review. Energy, 230, 120903.

Sunter, D.A., Castellanos, S., Kammen, D.M. (2019), Disparities in rooftop photovoltaics deployment in the United States by race and ethnicity. Nature Sustainability, 2(1), 71-76.

Sustainable Energy Development Authority Malaysia. (n.d.), Net Energy Metering (NEM) 3.0. Available from: https://www.seda.gov.my/reportal/nem [Last accessed on 2025 May 18].

Tee, M., Tu, L., Wang, A., Chaw, L.Y., Lu, L., Fernandez, R.T.T. (2024), Exploring the impact of pressures and moderating role of top management's environmental awareness on corporate green innovation: A case study of china-based MNC. In: Opportunities and Risks in AI for Business Development. Vol. 2. Cham, Switzerland: Springer Nature. p201-212.

Von Bertalanffy, L. (1968), General System Theory. New York. p40. Available from: https://books.google.com.my/books?hl=en&lr=&id=lcw9awaaqbaj&oi=fnd&pg=pa103&dq=general+system+theory&ots=yqc5d0rm6r&sig=fgqtev5xp4fwgzasdqvjwpmqvsc&redir_esc=y#v=onep age&q=general%20system%20theory&f=false

Zhang, S., Chen, W. (2022), China's energy transition pathway in a carbon neutral vision. Engineering, 14, 64-76.

Zikmund, W.G., Babin, B.J., Carr, J.C., Griffin, M. (2010), Business Research Methods: Sampling Design and Sampling Procedures. Mason, OH: Library of Congress.