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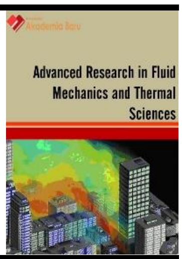

Systematic Review of Public Acceptance of Solar Policies: A Conceptual Framework of Policy Acceptance

Fatimah Azzahraa' Mohd Sobri[1,2,*], Mariani Ariffin[2], Amir Hamzah Sharaai[2]

[1] School of Technology Management and Logistics, College of Business, Universiti Utara Malaysia, 06010, Sintok, Kedah, Malaysia
[2] Department of Environmental Management, Faculty of Forestry and Environment, Universiti Putra Malaysia, 43400, Serdang, Selangor, Malaysia

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ABSTRACT

Policy goals for sustainable energy will be hampered without sufficient public acceptance and public support. While there is a growing body of literature on public acceptance for solar energy, most studies tend to investigate public acceptance of new technology, and not on the policies constructed that aims to help successful deployment. It is argued that without policy acceptance, the implementation of the technology is not going to be as smooth as planned. Thus, it is important to understand and reveal the drivers for public acceptance of these policies. A study was conducted with the objective to identify the key factors contributing to solar policy acceptance among individual homeowners. The constructs are then organized in a systematic manner to develop a framework to foothold the study model. This study integrates both the 'internal' factors and the 'external' factors in one framework that is both comprehensive and feasible to undertake. Following a systematic 4-step process of identification, screening, eligibility, and inclusion, relevant published materials were identified and gathered. The recurring factors contributing to policy acceptance are then extracted and analyzed. The factors are personal norms, environmental concern, economic, social, geographic, personal capability, and house characteristics. The factors were then categorized according to Stern's Attitude- Behavior-Context (ABC) framework.

1. Introduction

The study of public acceptance towards new technologies has garnered interest among many academicians who wish to measure the influence of technologies to consumers, especially for destructive innovations, like renewable energy (RE). Climate change and population bloom have forced countries across the globe towards finding a cleaner and friendlier energy alternative like RE. RE resources are abundant, largely untapped, and most importantly, naturally replenished on a human timescale [1]. Energy generated from renewable resources like wind, solar, biomass, hydro, tidal, and geothermal are argued to have a less environmental impact by emitting less carbon dioxide

* *Corresponding author.*
E-mail address: azzahraa@uum.edu.my

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compared to conventional energy sources [2]. RE also play a major role in meeting the country's goal for sustainability as it has the potential to alleviate poverty, expanding rural development, as well as protecting the health of the people by protecting the environment [3]. This can be seen from the success of the Programme Solaire (PROSOL) project in Tunisia and the Solar Home System project in Kenya and Tanzania [4,5]. Among the RE resources, solar energy has promising potential due to its abundance and its even distribution in nature than any other RE types [6].

These energy resources come hand in hand with their surrounding counterparts; i.e., the technology, infrastructure, policies, and regulations to harness it's potential. Public acceptance of the whole system is crucial for successful RE deployment while public resistance hinders the attainment of important environmental goals [7]. Thus, it is imperative to understand how the public forms an opinion on RE instalments and the reasons why the public opts or rejects such technologies. The success of new technologies is almost always associated with good policy support [8]. This part of the process is highly valuable for the success of RE deployment but is often overlooked behind 'technology acceptance' only. The pursuit to find policy acceptance had not been as popular and seem to be lacking in the RE acceptance study. Thus, it is crucial to understand the factors of policy acceptance, and how it can change for a smoother energy transition. This study aspires to fill this gap by identifying the common factors that contribute to the characteristics of acceptability for solar policies. Based on the identified factors, this study proposes a comprehensive conceptual framework that integrates the common factors via a systematic review of past literature on solar policy acceptance.

The paper is structured as follows. Firstly, the paper will explain the theoretical framework to frame the policy acceptance model which will serve as the backbone for our conceptual model. Secondly, it will provide the details of the systematic review from the method collection, findings of content analysis, and discussion of the findings. Finally, the paper proposes a comprehensive policy acceptance framework, including the factors that directly influence the policy acceptability of solar policy, and discuss the relevance of this framework.

2. Theoretical Background

The terminology for measuring acceptance is often used interchangeably for acceptance, acceptability, support and even adoption. Technology adoption as defined by Rogers [9] is a process from innovation discovery leading to final tool adoption. This paper defines adoption as the decision to accept and finally use the tool. Specifically, the adoption process can be subdivided into two sub-categories depending on the moment the adopter interacts with the technology [10]. This stems from the works by Huijts *et al.,* [11] on technology acceptance whereby public acceptance of technology can be defined as the behaviour that promotes the support towards the energy technology while public acceptability is the attitude based on evaluative judgment towards new energy technology. In easier terms and for this context, acceptability is the perception of policy while acceptance is the action taken based on the policy. Thus, in the timescale, acceptability is the prior experience that predicts intent to use while acceptance is the latter experience of real activity taken after evaluation of prior information [10,12]. Even though the definition provided by Huijts *et al.,* [11] were for technology acceptance, the suitability of the term can also be extended to policy acceptance as the idea of acceptance remains the same for policy as mentioned by Zoellner *et al.,* [13]. This distinction between intent to use (acceptability) and actual usage (acceptance) is important to clarify to form the proposed framework of policy acceptance and acceptability.

For policy acceptance studies, there are three major models identified; internalist, externalist, and integrative models [14]. Internalist frameworks look solely at the attitudinal motivations for pro-environmental behaviour. These attitudinal variables are those considered 'internal' to the individual, such as values, beliefs, emotions, and habits [15]. These models tend to be weak in explaining behaviour that might be influenced by other contextual variables like financial constraints and technology availability. On the other hand, externalist theories focus mostly on cultural, political, and economic factors, and tend to ignore many attitudinal characteristics associated with pro-environmental behaviour [16,17]. Integrative models combine insights from the 'internalist' and 'externalist' approaches to offer a broader perspective on the determinants of pro-environmental behaviour. Stern's [15] Attitude-Behavior-Context (ABC) framework is among the few integrative models that account for multiple 'internal' and 'external' factors. Stern [15] suggests three categories of individual characteristics of pro-environmental behaviour: 1) attitudinal, 2) contextual, and 3) personal capability variables. Attitudinal variables include values, general environmental concerns, and specific concerns about environmental issues. Contextual variables, on the other hand, includes social, political, and economic factors that serve as the reason for acceptance or rejection. The final category is personal capability, which looks at a person's state of being, and are generally assessed through socio-demographic characteristics [15]. The dimensions covered from this model will provide a more comprehensive insight into the factors for solar policy acceptance, while still being bounded and practical for empirical testing.

3. Method for Systematic Analysis

3.1 Search Strategy and Selection

This study employed a systemic literature review based on a four-step process, namely, 1) Identification, 2) Screening, 3) Eligibility, and 4) Inclusion, following Assifi *et al.,* [18] (Figure 1). Works of literature included under review were studies published within the past 9 years (2011 to 2019) as types of research on RE started to bloom after the year 2010. The first step (identification) was finding the relevant data based on related terms or keywords of publications retrieved from four established academic databases (ScienceDirect, Scopus databases, Web of Science databases, and Mendeley database) that provide extensive ISI-indexed academic journal articles. The main search used in each database was the term (policy acceptability or public acceptance or policy acceptance) and renewable energy. Databases that produce too many records were narrowed further using supplemental terms (solar energy, policy, public). Overall, the search produces more than 2,189 records, from which 62 papers were downloaded and further shortlisted based on the suitability of the research. Suitability of study was determined based on the research title where the search list that yields non-related policies (other renewable fuel policy, climate policies) were excluded. But most importantly, the title, in general, that did not imply policy acceptance was generally eliminated. As the primary goal is to identify and summarize findings that were related to policy acceptability and acceptance, we also included other types of reactions to policy found in the database, such as support, opposition, and, willingness to pay (WTP). There were no specifications made on the location of the case studies or the number of populations. There was also no limitation of the methods used to identify policy acceptance. Papers focusing on the acceptability of solar PV, solar thermal, feed-in tariff, etc., were considered relevant as RE solar energy. The second step (screening) involves trimming of the data searches based on relevance to the individual or home owner's adoption/acceptance by evaluating each publication based on its title (first) and abstract (second). From this, a total of 46 was shortlisted for the third step. In the third step (eligibility), the full text was analyzed in detail for their relevance to the factors contributing to solar policy acceptance among residential owners. Studies that investigate purchasing behaviour or willingness to pay for solar technology due to scheme and policy, is also considered in the review as policy acceptance.

Consequently, 24 full texts were identified. The last step (inclusion) includes a content analysis of all 24 papers.

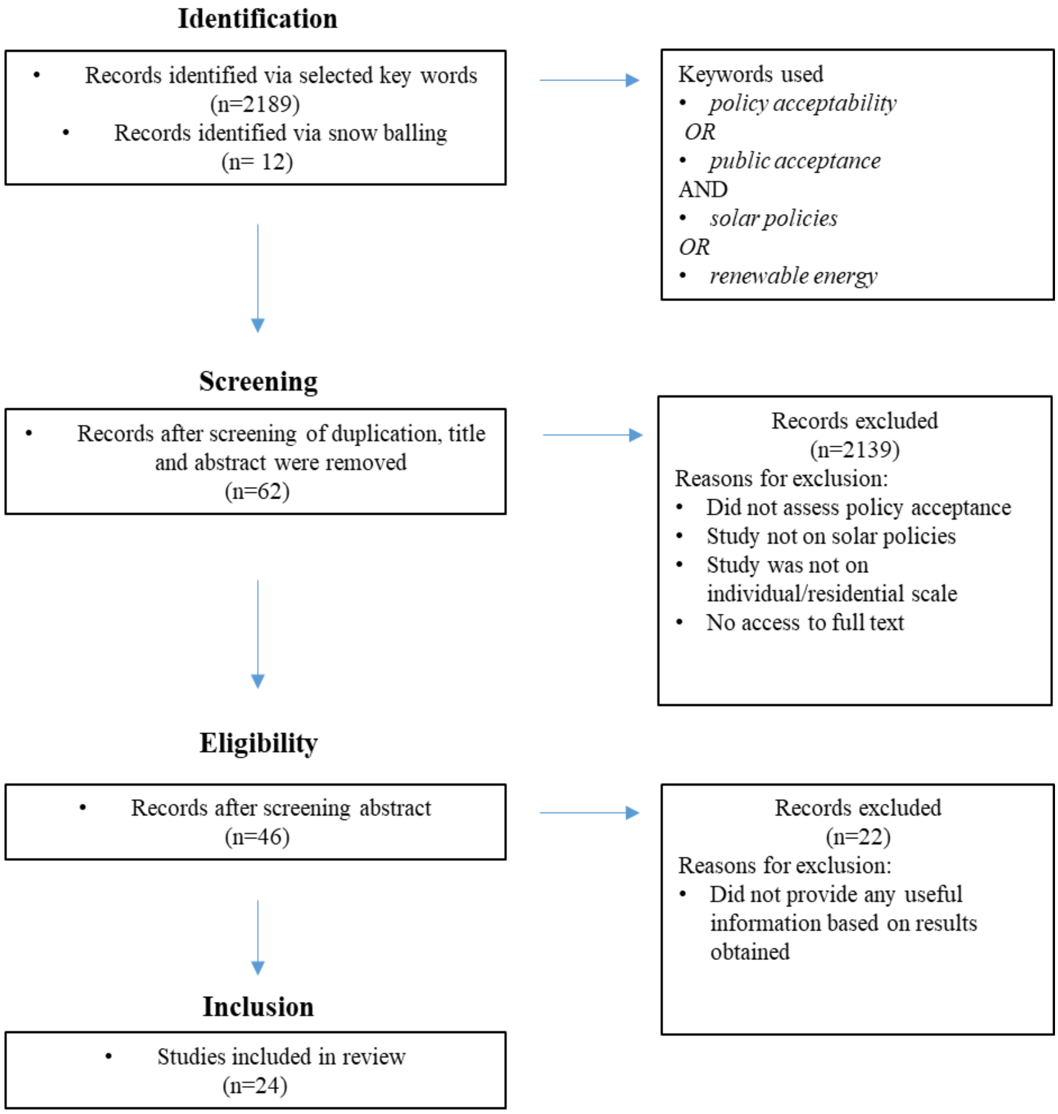

Fig. 1. Flowchart of the searching process and selection adapted from Assifi *et al.,* [18]

3.2 Data Extraction

The basic characteristics of each selected paper were extracted following a standardized form in the following areas: (i) the authors (ii) year of publication (iii) study setting, and lastly (iv) the country's policies or policy instrument investigated (Table 1). After the basic characteristics were extracted, the articles were reviewed word by word for factors influencing policy acceptance. This initial step was inductive in nature as any factors found were considered relevant.

3.3 Data Synthesis

Information from the selected articles was compiled in a spreadsheet with the help of ATLAS.ti 8 Software for better organization of the results. The results were then categorize following the ABC model via deductive reasoning.

4. Results and Discussion

4.1 Brief Overview of Studies Investigating Public Acceptance of Solar Policies

Table 1 provides the list of the 24 studies included in this review that relates to public acceptance of solar energy policies. It was found that the majority of the study area was located in developed countries (83.3%) with already established policies on RE and solar energy policies and only four were from developing countries (Figure 2). All 24 studies had at least one policy examined in their research, though many did not venture deep into the content of the policies and only described the policy instruments generally or described different scenarios in the policy. Feed-in Tariff scheme was the most researched policy instrument when observing solar-related policies as well as financial incentives with six of the identified paper's interests was how these incentive effect solar PV adoption and only two of the study investigated the effects of subsidy scheme.

Meanwhile, six of the studies did not specifically focus on one policy, or policy instrument, but observe the overall solar-related policies available in the country of interest. One particular study investigated the different scenarios of the payback period that is deemed acceptable for acceptance.

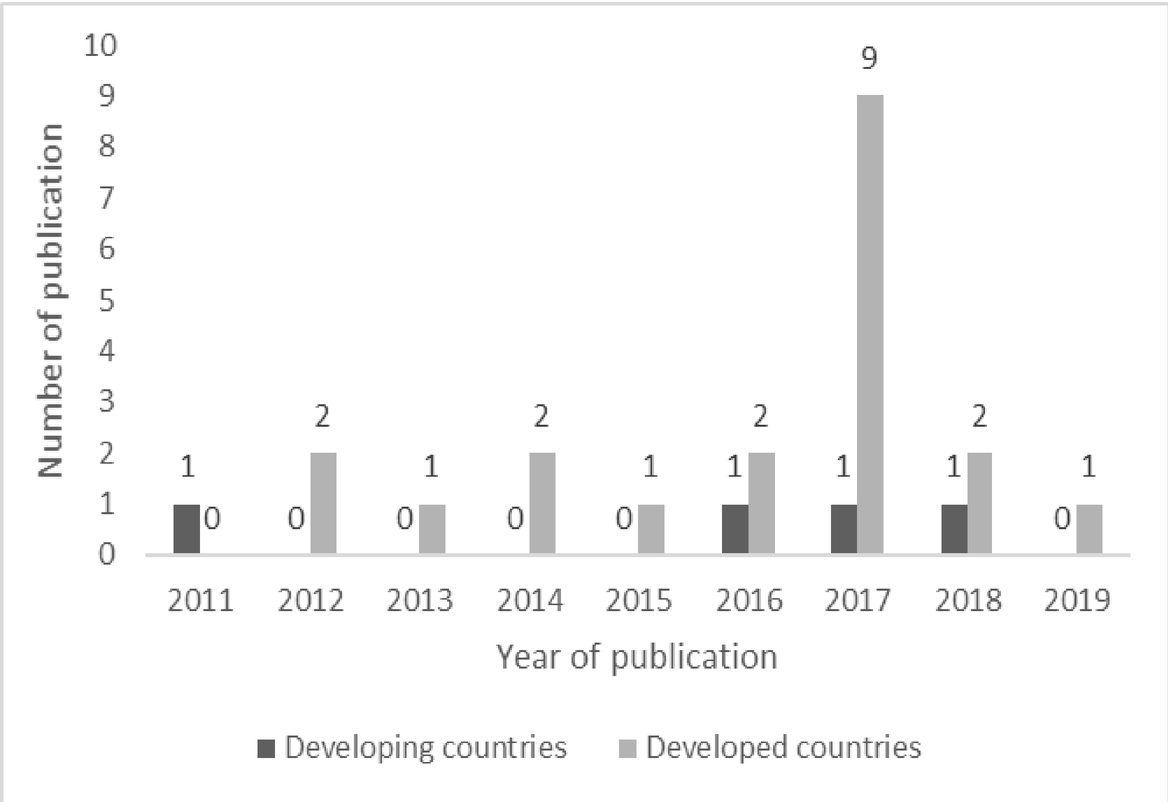

Fig. 2. Distribution of solar policy acceptance research by year of publication from 2011-2019

Table 1
List of studies included (2011-2019) by their study area and policy investigated (N = 24)

No	Year	Author	Country/Region	Policy/ Policy instrument
J1	2017	Braito *et al.,* [19]	Austria and Italy	Diverging policies
J2	2017	Hafeznia *et al.,* [20]	Iran	Local support policies
J3	2017	Crago and Chernyakhovskiy [21]	United States	Policy incentives
J4	2016	Chen *et al.,* [22]	China	Overall RE policies in China
J5	2016	Mignon and Bergek [23]	Sweden	TGC system (incentives)
J6	2017	Briguglio and Formosa [24]	Malta	Subsidy scheme
J7	2017	Fleiß *et al.,* [25]	Austria	PV-CPIs
J8	2015	Simpson and Clifton [26]	Western Australia	Local solar related policies
J9	2017	Punda *et al.,* [27]	Southeast Europe	Feed-in-Tariff
J10	2014	Antonelli and Desideri [28]	Italy	Feed-in-Tariff that has been uncapped until 2012
J11	2012	del Río and Mir-Artigues [29]	Spain	Feed in Tariff
J12	2017	Klein and Deissenroth [30]	Germany	Feed in Tariff
J13	2017	La Monaca and Ryan [31]	Ireland	Net Energy Metering, fixed and declining Feed-in-Tariff
J14	2017	Matisoff and Johnson [32]	United States	Utility incentives
J15	2016	De Groote *et al.,* [33]	Flanders (Belgium)	Local support policies
J16	2014	Shin *et al.,* [34]	South Korea	Renewable Portfolio Standard (RPS)
J17	2012	Sarzynski *et al.,* [35]	United States	State solar financial incentives
J18	2011	Thiam [36]	Senegal	Tariff incentives (Renewable premium tariff)
J19	2013	Byrnes *et al.,* [37]	Australia	Australia's RE policy
J20	2017	Simpson and Clifton [38]	Australia	Financial incentives (scenario analysis)
J21	2018	Simpson [39]	Australia	State financial incentives
J22	2018	Mah *et al.,* [40]	Hong Kong, China	Payback period scenarios
J23	2018	Palm [41]	Sweden	ROT-tax reduction and subsidies
J24	2019	Phillips *et al.,* [42]	Australia	50% RET (Renewable Energy Target for 50% energy mix in Australia)

4.2 Factors Affecting Public Acceptance of Solar Policies

The study identified 7 main factors associated with solar energy policy acceptability. The 7 factors are; (i) Environmental concern, (ii) Personal norm, (iii) Economic, (iv) Social, (v) Geography, (vi) Socio-demographic, and (vii) Household characteristics. The factors are classified into three main variables (Attitudinal, Contextual, and Personal Capabilities) following the ABC model. The factors can be seen summarized in Table 2 and are discussed in the following section based on the three variables and their relative importance towards policy acceptance.

Table 2
Factors and their identified influence on solar PV policy acceptance

Variable	Variable description	Identified influence*	Study
Attitudinal Variable			
Environmental concern	General concern or indifferent to the environment	Positive	J1, J4, J7, J8, J10, J16, J24
		Neutral	-
		Negative	J20
Personal norm	Believe or disbelieve in the obligation to reduce environmental harm (altruism)	Positive	J1, J3, J4, J6, J12
		Neutral	-
		Negative	J24
Contextual Variable			
Economic	Factors that involve financial gain and constraints		
i. Electricity price		Positive	-
		Neutral	-
		Negative	J1, J3. J5, J6, J7, J12, J24
ii. Incentives		Positive	J2, J3, J6, J7, J16, J21, J22., J23
		Neutral	J14, J17
		Negative	-
iii. Investment opportunity		Positive	J1, J3, J5, J7, J12, J19
		Neutral	-
		Negative	J3, J6, J16, J20, J22
Social	Trust or mistrust in government policies and solar retailers	Positive	J3, J6
		Neutral	-
		Negative	J8, J18, J21
Geographical climate	Solar irradiation	Positive	J2, J3
		Neutral	J10, J13
		Negative	-
Personal Capability Variable			
Socio-demographics	The socio-demographic of the respondents		
i. Age	The younger, the higher (25-44)	Positive	JI, J3, J6, J7, J15
		Neutral	-
		Negative	
ii. Education	The higher, the higher	Positive	-
		Neutral	
		Negative	J1, J3, J6, J15
iii. Income	The higher, the higher	Positive	J6
		Neutral	
		Negative	-
Household characteristic	Homeownership	Positive	JI, J3, J6, J7, J15
		Neutral	
		Negative	-

*Show the identified relationship it may bring about policy acceptance (positive = favorable for acceptance rate; neutral = non-relation, negative = non-favorable for acceptance rate)

4.2.1 Attitudinal variable

The first variable is the attitudinal variables. Attitude refers to the expression of favour or disfavours toward a thing, place, person, or event [43]. It generally means the intrinsic factor that motivates or prevent someone from engaging the next move or even being unaffected by the new information. The two main attitudinal variables identified in this study are environmental concern (EC) and personal norm (PN).

i. Environmental concern

Eight of the reviewed studies identified environmental concern as an important factor that influences policy acceptance. The majority of these papers (J1, J4, J7, J8, J10, J16, and J24) found it effective in promoting acceptance towards solar policies. Environmental concern is the most prominent factor in the attitudinal variable and may be explained due to the broad spectrum of the term 'environment' where most of the public have at least general knowledge and concern for it. J4 and J24 suggested that concern for the environment may affect purchasing behaviour, apart from other mediating variables. Depending on certain situations like availability and cost, consumers who are concerned about the environment generally will have a favourable attitude towards installing solar PV's in homes.

However, this result does not tally with the overall climate policy literature on the effects of environmental concern. Environmental concern has been a topic of interest in much environmental policy research and the results have been conflicting in many cases, though a general trend can be observed through which human being's environmental concern differs according to the country's development. A few researchers whose case studies were from developing countries found that environmental concern does not necessarily give a positive effect, but remains a neutral factor in policy acceptance [44,45]. Our systematic review of solar policy acceptance found only one neutral effect for environmental concern and this is from a case study in a developing country. Having said this, this number may largely be due to 83.3% of the studies were based on studies in developed countries. This shows that there is still needed literature on the acceptance of solar policies in developing countries.

ii. Personal norm

Personal norm is the belief in the obligation to perform a certain way [46]. This study distinguishes personal norm from environmental concern in the sense that personal norm looks deeper into a person's behaviour and provides a more concrete case for policy acceptance [21]. A person's personal norm towards protecting the environment can eventually lead to the acceptability of the policies [15,47,48].

The systemic review found 5 studies identifying the positive effect of personal norms. J6 claims that pro-environment sentiment is closely related to the fulfilment of contributing to society. This 'warm glow' altruism has been mentioned by Andreoni [49] whereby some individuals contribute personally to the environment instead of relying on other people (a common NIMBY (Not in My Backyard) attitude [50]). Personal norm thus plays a bigger role than environmental concern in solar policy acceptance as this sense of responsibility and obligation is more rooted compared to simple concern. This was supported by J3 whereby it is possible that solar PV instalments are predominantly driven by altruism and that the public would have adopted the technology even without monetary incentives.

4.2.2 Contextual variables

As oppose to the attitudinal variable that focuses on individual intrinsic motivations for policy acceptance, contextual variables look into matters that are extrinsic to a person such as the availability of incentives, the geographical location of the house, or the availability of the technology. The three main contextual variables identified in our study are economic factors, social factors, and geographical factors.

i. Economic factor

Out of the 24 papers in this study, 18 papers observed the economic factors towards solar policy acceptance, whether as a single factor or a complementary factor of other contributing factors, making it the most studied factor in solar policy acceptance. The results produced multiple economic-related factors found in the search which can be classified into three prominent categories; 1) electricity price, 2) incentives, and 3) investment opportunity.

- Electricity price

Electricity price was a variable for nearly half of the economic factor found in the systemic review. The price issue was found from two angles, 1) the electricity price consumers have to pay if they install solar PV in homes (the initial installation and the electrical bill) and 2) the conventional electricity price. J3 (US) argued that with the increasing electricity prices (conventional form), there is a great likelihood that consumers will accept the policies. Contrary to this, J16 (South Korea) found that if the electricity price increases due to solar PV instalments, consumers will not opt to use solar PVs in homes. This result contradicts with a few willingness to pay (WTP) studies on renewable energy as studied by Ma *et al.,* [51] and Sundt and Rehdanz [52], that found consumers generally willing to pay for green energy plans in their regional area. Having said that, these studies by Ma *et al.,* [51] and Sundt and Rehdanz [52] were from developed countries (US, Finland, Italy, Chile, and Germany) that have more established policies than most developing countries. Another study by Soon and Ahmad [53] on WTP shows a higher WTP in North American countries compared to Asian countries. Thus, the general trend we can observe here is the consumer's willingness to pay for electricity price differs between developed countries and developing countries.

The upfront cost was also an issue by potential adopters as pointed out by J6 and J22, but can be managed depending on the policies provided. This was supported by International Energy Agency [54] with the World Energy Outlook in 2016 and Renn and Marshall [55] whereby the upfront cost remains a hurdle that requires government intervention to monitor and guide the adoption of residential solar PVs by utilizing the policy instruments available.

Having said this, solar PVs have seen a tremendous cost reduction and are increasingly becoming cost-effective for homeowners and the community [41,56,57]. With third party ownership options (e.g., TPO contract) under solar lease or power purchase agreement, electricity consumers only have to pay a small amount or nothing at all for the upfront cost of installing solar PVs and is guaranteed supply from the system at an attractive fixed rate. Again, this is highly dependent on country policy but third-party ownership has become the predominant ownership model in the US residential market [58].

- Incentives

Incentives reported the highest variable with 60% of the economic factor systematic review. Incentives found from policies consist of rebates, grants, and taxes issued by government policies. The majority of the studies that examine the effects of incentives identified incentives as a positive relation to policy acceptability especially for rebates and grants. J2, J3, J6, J7, J16, and J21 all concluded that financial incentives resulted in stronger solar PV demand from their respective countries. This was because the grants significantly help reduce the upfront cost of solar PV installation that was perceived as a huge barrier to solar PV adoption [31,59].

On the other hand, two of the studies (J14 and J17), found tax incentives to provide a more neutral connotation towards solar PV adoption where the tax incentives were observed to be ineffective in modifying the respondent's behaviour. The reason for this could be because the tax incentives did not reduce the upfront cost in certain countries (J14) or that the incentive may not be too visible (J17).

- Investment opportunity

The results from review once again did not provide a unanimous agreement where 6 of the studies (J1, J3, J5, J7, J12, and J19) found that solar PV schemes and policies were perceived as a good investment opportunity by the public, while 5 other studies (J9, J13, J16, J20, J22) found that installing solar PVs in homes was not seen as a good investment but a bad one as the payback time was considered too long to warrant the large investment. This difference is understandable as the policies in place for each study are different as well as the technology advancement in different countries. Examples of cases where solar PV policies recognized as a good investment opportunity is the HELIOS scheme in Australia (J7) where the investment was too attractive and was perceived to be 'too good to pass' by the public, and during reduction of remuneration (J12) where the investment was considered the final opportunity for a very good rate. The latter reason is aligned with the study conducted by J20 where a change in policy (incentives) for a less attractive rate can be the 'cue to action' needed by the public to install PVs in homes. They found that the time limitation in certain subsidies contributed to many adopter's decision-making processes.

This study thus concludes that the investment opportunity is only positive if it is supported by other schemes that can help reduce the upfront cost and the installation fee.

ii. Social factor

The variables for social factors can be measured through the trust levels in the key players affected by the policy [60]. The 'Trust Theory' proposed by Castelfranchi and Falcone [61] suggest that if knowledge and time is a limiting factor, policy acceptance will be based on their trust for the entities solving the issue i.e., relating to environmental issues and in this case, the government, and retailers. The study identified three affiliations of social factors; 1) trust in the effectiveness of government policies and schemes, 2) trust in government and 3) trust in solar retailers.

The results show that trust in policy is generally attributed to types of policy schemes available in the state or country. Out of the systematic review, only three studies investigated user's trust towards policy schemes and the relationship provided mixed results. Both positive and negative relationship was observed. A positive relationship was found in J3 study that illustrates how rebates significantly help lower upfront cost and the existence of solar rights resulted in the public's confidence and increased trust towards adopting solar PV. This was proven in several studies whereby incentives or rebates were able to garner the interest of potential adopters to invest in small scale solar PVs [20,21,25].

On the other hand, J8 only reported a negative relationship of trust in governmental policies whereby the users of installed solar PV were overall dissatisfied with the policy scheme and its management. This study is different from J3 as it interviews solar PV adopters that have used the technology for quite some time. It was observed from the case of J8 that the majority of the adopters were sceptical in the government's commitment to increase RE deployment as they think the solar industry in their country is not well regulated. This distrust stems from a few cases of reduction in tariff rates and a lack of transparency in the solar instalment and payback process. Another cause of distrust or dissatisfaction was due to a policy scheme 'Renewable Energy Buyback Scheme' tariff rate in which the majority of adopters think the scheme to be unfair due to the significant price difference of the money they received for each unit they sell to the grid versus the electric price utility companies sell later. Having said this, the utility companies did explain the high cost was due to paying other managing processes. The problem here can be easily settled and put to ease by informing the adopters and increasing the transparency of the process as suggested by Simpson and Clifton [26].

The research also found that distrust in solar retailers may affect purchasing behaviour (J8). Though this factor does not directly impact acceptance of solar policies, a systematic regulation of solar retailers and manufacturers in the country that prevents any rip off towards purchasing parties will help gain some amount of trust among potential solar PV installers. This factor was supported in the literature by Baskaran *et al.,* [62] where they found that the inability to find a trustworthy solar retailer prevents consumers from purchasing solar water heaters in homes.

Another social factor found in this research is trust towards solar technology (J8) and peer effects (local champions) (J21) but is not included as it does not relate to solar policy acceptance.

iii. Geographical factor

The study identifies geographical factors as factors that are affected by the type of policy available in the location, and the amount of solar irradiation available in the location. The type of policy available depends on the jurisdiction of the policies. All of the studies had different policy schemes and incentives that are unique to the area. Even the tariff rate for FiT differs from one country to the next. J9 argued that the policy support available is dependent on solar irradiation the area receives but J3 found that there is little difference of FiT schemes in two different irradiated areas. On the other hand, the amount of sunlight received, directly influence the public as found by J2 where high irradiated areas have more adoption rate. This contradicts with J10 which found that only big companies consider solar irradiation in selecting facility sites while individual homeowners did not. Therefore, the acceptance of policy schemes and solar PVs may or may not be influenced by geographical criteria of different solar radiation as well as other driving factors.

4.2.3 Personal capability variable

The final variable based on the ABC model is the personal capability that generally involves factors measured through the socio-demographic characteristics, though it can be any factors that involve the individual current capability [15]. This study found two personal characteristic variables which are socio-demographics of the respondents and their homeownership.

i. Socio-demographics

Only 6 of the papers from the systematic review observed the socio-demographics of the respondents. The lack of papers observing this factor may be due to the different stream and focus of the research as well as 6/24 of the papers were review papers that did not have a sample population. From the papers that did measure the socio-demographics of their respondents, age, employability, income, and education were among the most discussed factors for policy acceptance.

The majority of papers (5/6) measuring the age of respondents to their acceptance level identified younger individuals more inclined to accept solar policies. It must be noted that all of the papers define younger individuals as those of age group from 25-34 and 35-44. Any age group above 44 is considered the older generation. This might be as the two sets of group range are usually the age group that is purchasing or renovating new houses as found by De Groote *et al.*, [63] for the population in Flanders, Belgium.

However, J1 found an interesting relation between the young generation and the availability of attractive incentives. The paper concluded that the younger population's uptake on solar PVs is dependent on good incentives where they are more likely to adopt the technology (as a result of accepting the policy) if and only if it is considered profitable. J3 assumes that the young generation accepts the policies and incentives due to being able to enjoy the benefits from the investment longer.

Secondly, is the education level. Surprisingly, 4/6 of the papers (J1, J3, J6, J15) examining the socio-demographic of their respondents did not find any significant impact on policy acceptance. This contradicts the understandings of PV adopters being more educated [64,65]. One study (J1) even found that those without a higher education degree will still invest in solar panels if the incentives were attractive enough. This was in line with the works by Upham *et al.,* [66] that inferred respondents with less education are less willing to engage in any pro-environmental behaviour until the price of the environmental item or technology is reduced by financial incentives.

This study also found that employment (2/6) and income (3/6) were considered significant factors for solar PV acceptance.

ii. Homeownership

It is considered a very important factor to have a house before the potential adopters will purchase the solar PV. This was found in all of the systematic reviews that owning a house, coincidentally a roof space is of foremost importance [19,25]. This was aligned with current literature where people living in rented homes have a significantly lower probability of wanting to install solar PVs in homes. As solar panels are easily mounted on rooftops where naturally it is left bare, space factor that usually comes from installing RE technology would not be an issue. Having said this, roof positioning still plays a factor in making sure maximum sunlight is able to be captured and harness for optimum generation [67].

Thus, from the findings, the most prominently discussed personal capability factors are the public's age, education level, income and homeownership.

5. The Proposed Framework for Solar Policy Acceptance

The data and results obtained from the systematic review show that contextual factors and psychological factors are usually studied independently and hardly ever studied as potential variables together. From the review, we found 7 main reoccurring variables that contribute to solar policy acceptance. From these variables, we propose that the psychological and contextual factors should be studied together following Stern's ABC model [15] and that policy acceptability will eventually lead to policy acceptance (the adoption of solar PVs on residential homes as shown in Figure 3).

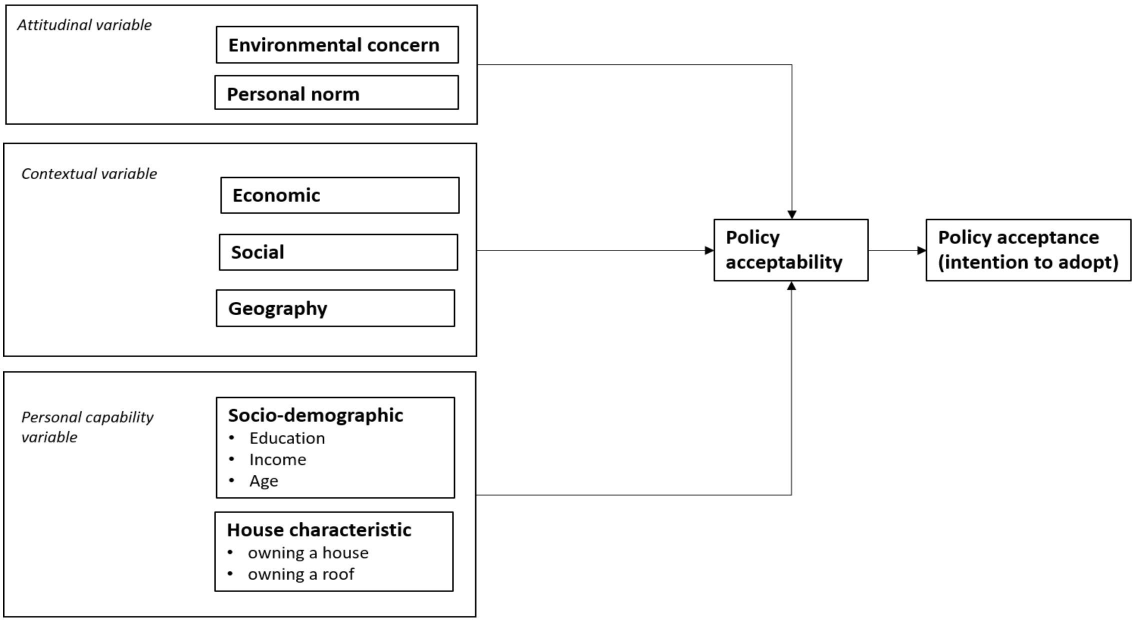

Fig. 3. Proposed Solar Policy Acceptance Framework

6. Conclusion

This study reviewed 24 literatures from the past decade to single out the most talked factors contributing to policy acceptance around the globe. The framework propose is constructed loosely to fit the variety of scenarios of solar policies in different countries as well as the nature of people from developed and developing countries. The significance of this framework is that it is not limited to only the psychological factors or economic factors that has been extensively studied in the majority of previous literature. By considering a more comprehensive and overall view of the acceptance issue, the dominant variable of policy acceptance can be determined and policymakers will be able to target the correct factors for the correct community. An important area for further studies is to observe the effect of information provision as many are not aware of the policies to begin with, and how information may affect the identified factors and policy acceptance.

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