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RENEWABLE ENERGY INVESTMENT: APPLYING A MOTIVATION, OPPORTUNITY, AND ABILITY FRAMEWORK IN EVALUATING INVESTMENT BEHAVIOUR

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Abstract

In view of the recent intensified focus on renewable energy, different policies and support schemes have been extensively employed and implemented to promote the use of such by governments around the world. Previous research has focused on various technical and socio-economic challenges and solutions to renewable energy investment. But it is also important to identify and develop a multidimensional perspective of such barriers in order to increase investment.

In this paper a model has been proposed to examine the investment behaviour in renewable energy which relies upon the Motivation-Opportunity-Ability framework illustrating how different barriers may associate with motivational, contextual and situational factors affecting investment behaviour. In addition to traditional investment rules, firms' investment behaviour is determined by a number of other cognitive factors. Investment behavior is further conceptualized incorporating different barriers, and a model has been proposed to test how the behavior of investors' could be influenced by such barriers.

Keywords: Motivation-Opportunity-Ability (MOA) framework, Investment behavior, Renewable energy, Barriers

Topic Groups: Social sciences and business; Industry, area or region specific study

JEL Classification: Q20, O13, Q42

1 INTRODUCTION

In order to support the Renewable Energy development initiatives, a lot of investment efforts have been made by governments around the world. For addressing this issue, public policies in many countries such as Sweden, UK, USA, Netherlands, Ireland, Spain, and China allocate significant amounts of money (Andreea, 2009). Different policies and support schemes were extensively employed and implemented to promote the use of renewable energy. They are namely pricing laws, quota requirements, production incentives, tax credits and trading systems. Two support schemes, feed-in tariffs and renewable energy certificate trading are mostly common to encourage the investments in renewable energy sources for electricity production (Lipp, 2007; Boomsma, Meade & Fleten 2012).

In light of the renewed focus and policy and technology developments, companies now have extraordinary opportunities to develop their businesses in the renewable energy sector. Governments in various countries are looking for huge levels of new investment in renewable energy sources and it is quite challenging for infrastructure investment (Lewis and Wiser, 2007). In order to encourage private investments in renewable energy sector, energy sectors was restructured by governments around the world (Stone, 2002). Even though there is an enormous body of research focusing on normative perception, less empirical work was conducted to see what the main driving factors are switching from traditional energy sources to renewable sources (Marques et al. 2010). Considerable attentions were given in past research on issues related to various social, technical, and economic challenges and solutions to renewable energy investment. But it is also important to identify multidimensional perspectives of those barriers and there is a pressing need to identify the most significant barriers to renewable energy project implementation in order to increase investment in this sector (Richards, Noble & Belcher, 2012).

Behavioural factors have an important influence on decision making process to invest in renewable energy sector. Investors' beliefs, their attitude regarding the technological challenges, preference related to economic policy instrument have an influence on their willingness to invest (Masini and Menichetti, 2012). Thus, conducting a study on investor's perception and attitude regarding the risk perception and assessing how much they are relevant to making investment decisions is crucial. (Wustenhagen & Menichetti 2012).

In this paper, the model have been proposed to examine the investment behavior in renewable energy sources for electricity production from the investors' perspective. The main purpose is to propose a model to test investment behavior under different barriers associated with renewable energy development. From previous literature investment behavior is conceptualized and the different barriers associated with it in the renewable energy sector.

2 THEORETICAL BACKGROUND

2.1 Factors influencing behavior choice and investment behaviour

Theory of Reasoned Action (Ajzen & Fishbein, 1980) and Theory of Planned Behaviour (Ajzen, 1991) have both dealt with choice of behavior, where there have been reasons behind the choices made (East, 1993). IN Theory of Reasoned (TRA), Ajzen and Fishbein's

assumption was people engaged in rational behavior and weighed the consequences of any action they might take or choice they make. The subsequent Theory of Planned Behaviour (TPB) proposed frameworks to investigate the different factors behind behavioural choices in varied areas. In the TRA model, behavior is anteceded by intention to perform the behavior. Such intention again is pointed out to be a result of two components, which are subjective norms and attitude towards a certain behavior. The model predicts that the attitude will be determined by salient beliefs held by the subject regarding whether performance of the behavior will result in a desired or given outcome. Subjective norm is defined as normative beliefs arising out of subject's referents' advices. It also includes subject motivation or degree of willingness to take into account such advice as a moderating variable.

The theory of reasoned action and the theory of planned behaviour have been empirically tested to evaluate decision making behaviour of individuals and small to medium sized enterprises in the areas of financial decision making, strategic decision making and professional decision making (Southey, 2011). Cordano & Frieze (2000), applied the theory of planned behavior in environmentally sensitive decision process. They have identified the manager attitude, beliefs and perceptions regarding the environmentally sensitive decisions. Marquardt & Hoeger (2009), has used the theory of planned behaviour along with the implicit attitude measures in order to test the effect of implicit moral attitudes on Managerial Decision-Making. The theory of reasoned action and planned behavior were tested to investor's investment behavior (East, 1993).

The evaluation of financial decision making is an area of concern which has involved a variety of methods and theories to research the behaviour of individuals. For the most part research has been focused on the economic theory of rational decision making. From the previous research it was found that most of the focus had been given on economic theory of rational decision making in order to evaluate the individual's behavior of financial decision making, and limited attention was given behavioural theories (Southey, 2011). According to behavioral finance, if we consider the investment from a behavior perspective then perception is an important consideration which is related to risk and return. Since human beings are making the investment decisions, their decisions are influenced by some reasoning or cognitive factors (McFadden, 2001). Hofmann, Hoelzl & Kirchler (2008) suggested that both financial and moral considerations have an influence on investment decisions. In their study they have tested the applicability of theory of planned behavior along with other behavioral models in the context of investment decisions. The results of the study described invest decision to be influenced by participants' utility of morality, by intention to invest, and by moral intensity of the investment which is directing towards profit.

Thus in case of investment decisions risk and return are important considerations. In order to increase the investment in renewable sectors, policy makers should take initiatives to reduce risk and ensure acceptable returns. Providing this kind of policy framework also considers perception since things are happening under bounded rationality. Different investors have different perceptions and investment choices under the same investment opportunity. Within the same conditionalities, some investors may perceive investment in renewable energy to be too risky and some of them may perceive it as a good opportunity. So it is important to consider behavioural factors to investigate investor's perception and attitude and how they influence their investment decision making process. (Wustenhagen & Menichetti, 2012).

2.2 The Motivation – Opportunity – Ability (MOA) Framework in determining behavior

Consumer behavior researchers first proposed the Motivation-Opportunity-Ability (MOA) framework in the context of information processing theory to explain consumers' information processing behavior in advertisement effectiveness (MacInnis and Jaworski, 1989; MacInnis, Moorman, and Jaworski, 1991). They developed this model and this model has been well established and widely used in a wide number of studies (Clark et al. 2005; Hung et al. 2011; Andrew 1988; Batra and Ray, 1986; Heer & poiesz 1988; putrevu & Lord 2003; Johar and Simmons, 2000). According to the MOA Model (MacInnis and Jaworski, 1989) antecedents, processing, and consequences are the three components of information processing. In the context of brand information processing, motivation and opportunity are described as an antecedent. Motivation is an important factor to achieve the desire goal. The realization of the difference between the present situation and the desired situation is the starting point of information processing. The model proposed that when consumers are motivated, they have the ability and opportunity to process information and it is at that time they will process information from an advertisement.

Hughes (2007) used the MOA (motivation, opportunity, ability) framework which is well suited to the investigation of behaviors. Hughes mentioned that it is motivation that provides impetus toward a certain desired behavior, and additionally contextual and situational factors also have an important influence on behavior. They have hypothesized relationships where behavior is directly influenced by motivation; Ability and Opportunity as moderating influences on the link between Motivation and Behavior. Motivation is defined as the rationale and desire to act toward a behavior; Ability describes skills and capabilities necessary to the enactment of a behavior; and Opportunity is the contextual and situational controls related to the performance of the Behavior.

Clark, Abela, Ambler (2005) used the MOA framework for investigating organizational motivation, opportunity and the ability to measure processing of marketing performance information. They had conducted a survey among 66 senior managers at large corporations to examine the organizations' motivation, ability and opportunity and their intention regarding the marketing performance measurement system. They had used MOA as a theoretical model to link the managerial behavior in processing marketing performance information. The influence of motivation, opportunity and ability to process marketing performance information on managerial behavior was tested in their study.

Hung et al. (2011) have developed a community participation behavior general framework in tourism development. They applied the MOA model to test the efficacy of an integrative model for community participation behavior in tourism. From their study, they found public's motivation for participation, their ability and their opportunity to participate are the three necessary antecedents of community participation; and they also found that the situational factors affect level of participation. In the Social marketing context, this Motivation, ability and opportunity (MOA) framework was applied by Rothschild (1999) to measure expected behavior. According to their study, segmentation in social marketing was done based on motivation, ability and opportunity whereas 'wish to act' was defined as motivation, skills or expertise was defined as ability and the lack of environmental barriers to action was identified as opportunity in the position of behaving in the expected way. Olander & Thøgersen (1995) identified the determinant of consumer behavior with an environmental impact by using Motivation, ability and opportunity framework. In their study, motivation

ability and opportunity was included as the three main determinants of performing environmental friendly behavior of individuals.

The motivation, ability, opportunity model is founded on the principle that a lack of motivation, ability, or opportunity could be responsible for perceived barriers in people's action (Wiggins, 2004). Following this argument in the next section will discuss the perceived barriers in renewable energy sector.

2.3 Barriers in the renewable energy sector

Several studies have analyzed renewable energy development barriers in the past. Based on the previous literature, several barriers associated with renewable energy development around the world will be discussed.

Previous research identified several barriers that have prevented penetration of renewable energy technology to a broader scale; which include technical barriers, cost effectiveness, institutional, political and regulatory barriers, social environmental barriers, and market barriers such as inconsistent pricing structure. These barriers may be specific to a country or region, or in some cases they are related to technology related challenges (Painuly, 2001). Painuly (2001) conducted studies in the renewable energy sector and categorized major barriers as Market Failure/imperfection, Market Distortions, Economic and Financial, Institutional, Technical, Social, Cultural and Behavioural.

Richards et al. (2012) reviewed previous literature in the field and conducted study in wind energy development to identify the challenges associated with necessary investment in renewable energy. They mentioned high capital involvement and maintenance costs of renewable energy projects, disagreements over the balance between investment in the environment and economy, contradictory knowledge about the benefits of wind energy, conflicting faith in technology to accommodate high levels of wind energy, economic barriers, lack of social interest in and support for wind energy, political barriers to be responsible for improvement of renewable energy.

Martin & Rice (2012) conducted a qualitative study and examined the barriers to renewable energy implementation in the Australian state of Queensland from a firms and stakeholder organizations perspective. A range of financial, infrastructure, technical, regulatory, economic, and information barriers were identified for the firms and stakeholder organizations. In their study they mentioned the most noticeable barrier for RES supply in Queensland was finance related issues. For large scales renewable energy projects, in isolated regions high capital costs reduce the potential investment. Insufficient financial incentives, Project finance availability and the inability to negotiate profitable long-term (25-30 year) Power Purchase Agreements (PPAs) with government businesses and private power companies are other factors identified as major financial barriers in renewable energy development. Technical storage and replacement mechanisms to support the occasional operation and control of power delivery to the grid and ability to maintain a skilled technical workforce under the country's current economic conditions were identified as technical barriers. Insufficient network capacity and Remote grid connections and access were identified as infrastructure related barriers. Regulatory barriers mentioned in their study are complex zoning and planning, multi-tiered government approvals, land access and use. Economic barriers were related to abundant fossil fuel resources and cheap coal fired power. Information, education, and awareness regarding renewable energy were also identified as barriers in their study.

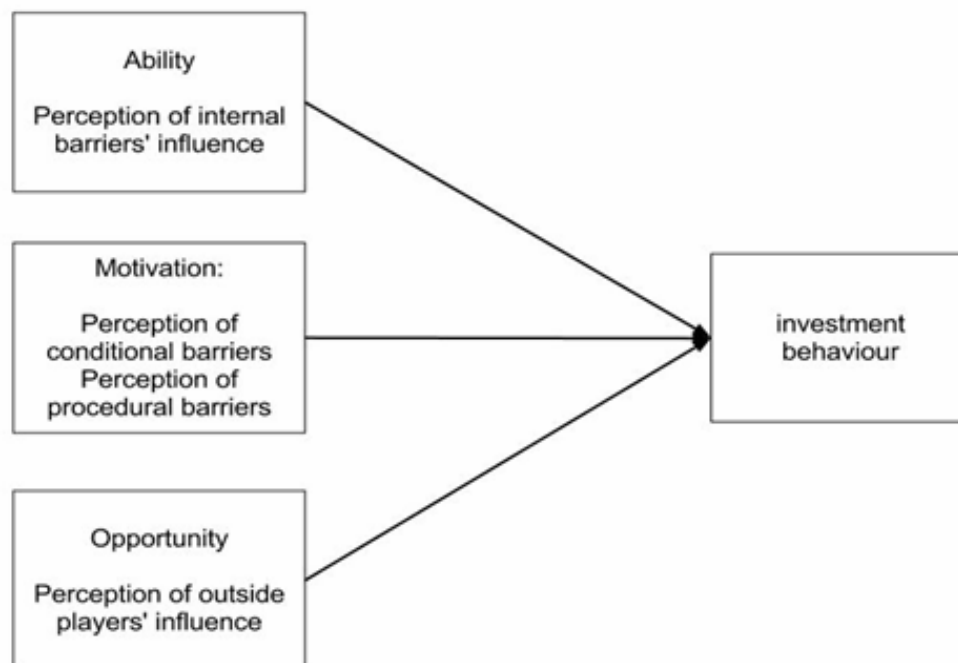
Oikonomou et al. (2009), conducted a case study in barriers to wind project financing in Australia and mentioned that it is essential to identify the importance of those barriers, who he classified into five major categories: (a) technological; (b) environmental; (c) social/public opinion; (d) economic and (e) regulatory, administrative and legislative. Limitation of network and absence of balance between demand and the offer of the energy were identified as technological barriers. Environmental barriers include effects on the ecosystems, effects on the landscape and change of land use. Social/public opinion barriers are related to Optical harmful effect and Insufficient sources of information. Marketing obstacles, market distortion and competition, indirect distortion of the kWh costs were associated with economic barriers. Regulatory legislative and administrative barriers focused on lack of rules and laws imposing the respect, lack of investment and development structures, lack of rules and laws imposing the respect of the environmental rules and terms, lack of an installation planning policy, legislative limitation regarding the load factor of the turbines.

Kaldellis (2007) conducted a detailed review of the existing situation in small hydro power electricity generation in Greece. Their main focuses were Technical and economic concerns associated with small hydropower plants. They identify administrative bureaucracy as a major drawback in small hydropower stations since investors had to wait a long time to get their final license. They also pointed out the absence of an integrated national water management plan by the State, limited social-economic influence at the local and national levels, lack of essential expertise and the technical equipment to optimize the plants, low water volume rate available and the operational restrictions imposed by the hydro turbines of the installation as challenges in small hydropower development projects. Denault, Dupuis & Couture-Cardinal (2009) have also identified that risk related to water inflows shortage and the variations in the inflow over the time are two of the main factors of project profitability. Uncertainty related to future electricity prices and variations in water inflow over the years are important challenges to assess small hydropower plant (Bøckman, Fleten, Juliussen & Langhammer, 2008).

3 PROPOSED RESEARCH MODEL AND FURTHER RESEARCH SUGGESTIONS

After reviewing the work done in past research efforts, in the proposed research model, the barriers has been categorized within three top level constructs: Ability, motivation and opportunity, which has are then hypothesized to have an influence of investors' Investment behaviour. From previous studies (Hughes, 2007; Rothschild, 1999) in motivation, ability and opportunity model, motivation is the desire to act; ability is the absence of individual barriers in action and the situational barriers in action was identified as an opportunity. Investment behavior is not always dependent upon a pure cost-benefit analysis alone, but as identified before, may take into account a number of external and internal environmental and contextual factors, as well as the decision makers' psychographics. The previously identified explicit factors were included; and categorized them within the broader contexts by linking with the MOA model. This helps us to both achieve the granularity and the broader perspective needed to evaluate the factors in an overall decision making process context, rather than treating each factor in isolation. It is hoped this will provide a more holistic explanation of the behavior and the decision process

Figure 1: Proposed model for the study



3.1 Conceptualizations of the variables and proposed hypotheses to test the research model for future research

In the proposed model the three factors motivation, ability and opportunity include multiple barriers to investment participation. In this paper Investment Behaviour is defined as “how likely it is that the investors intend to invest in renewable energy projects”.

When applied to expected investment behavior, motivation can be defined as the desire or willingness to invest. Based on the motivation defined in the previous research motivation is conceptualized as private investor’s incentives towards investment in renewable energy projects. Barriers that influence the willingness to invest are included to measure motivation. In other words, if the perceived barriers are less, the motivation will be high to invest. Motivation could be measured by perception of conditional barriers and perception of procedural barriers which might increase or decrease the willingness to invest. Procedural barriers are related to consultation process, during the licensing process, technical planning development stage and the construction stage. Conditional barriers can be related to high taxes, high investment cost, low electricity price, delay in obtaining services, delay in obtaining components, problem with net access, delay in obtaining fund, overall project risk. According to Painuly et al. (2001), market imperfection may lead to a lack of investments in RETs since it increases uncertainty, and hence costs. These barriers may increase cost of product to the consumer and also acts as an entry barrier for entrepreneurs.

Several factors work as economic policy actors towards formation of public policy, including several types of incentives. Such as, grant or low interest loans that may work as investment incentives, taxes and other incentive tariffs such as feed-in tariffs, incentives in research and development etc. Other notable factors can be setting mandatory renewable energy targets such as production quotas, implementation of tradable certificates etc (Van Rooijen and van Wees, 2006; Wang, 2006). The discussion of motivation in renewable energy investment can be tested with the following hypothesis:

Hypothesis 1: The expected investment behavior in renewable energy is positively influenced by the desire or willingness to investment. The greater the perceived desire, the higher the investment.

Based on the previous discussion, opportunity is defined as the absence of situational barriers to invest. Opportunity / external barriers are outside an investor's control and affect the possibility to invest. Based on the previous research we conceptualized opportunity as "contextual and situational constraints which are not in investor's control and relevant to the performance of the investment Behavior". Investment opportunities are naturally evaluated by investors based on potential returns after adjustments for any risk involved. However, in case of renewable energies, external environmental factors have a larger impact on chances of return compared to conventional energy projects. As a result, investment decisions in renewables are also influenced to a larger degree due to such factors (Wustenhagen & Menichetti, 2012). In this study perception of outside actor's influence was considered as external factors/barriers related to opportunity of the investment.

A long time waiting for obtaining the final license due to the environmental rules imposed by the authority and administrative bureaucracy proves one of the major obstacles for renewable energy investment. Conflict with different external groups such as private sector (eg. tourism), organized opposition groups, the municipal administration, the municipal council, county council, National Health Screening, media, neighbor's / representatives from the community, Local people living near to the power plant, landowners resulting in delays in investment.

The discussion of opportunity in renewable energy investment can be tested with the following hypothesis:

Hypothesis 2: The expected investment behaviour is negatively influenced by the situational barriers. The greater the situational barriers, the lower the potential for investment in renewable energy.

Based on previous research 'Ability' is conceptualized as an investor's own skills and capabilities required for the implementation of an investment in renewable energy project. Ability can be defined as the lack of company exclusive individual barriers to invest (such as lack of funding, lack of technical knowhow, lack of access to grid connections, lack of company's internal resources). Ability / Internal barriers include all barriers that influence the investors own ability to carry through with the investment. Management/ Organization's internal barriers were selected criteria for this study to measure ability or internal barriers. Management/ Organization's internal barriers involve Conflicts within the owner group, Lack of competence, Problems with securing adequate equity funding, Lack of capacity to prioritize project management, Internal resistance towards change or the project itself.

The discussion of ability in renewable energy investment can be tested with the following hypothesis:

Hypothesis 3: The expected investment behavior is positively related to the companies' ability to invest: the greater the ability, the higher the level of investment in renewable energy.

4 RESEARCH IMPLICATIONS AND CONCLUSION

This paper proposes a model to investigate the challenges associated with the implementation of renewable energy development projects, and investigate how these challenges are related to the investor's investment behavior which may have an impact on preventing such projects from being implemented. It is hoped that further findings from this research work will drive a longer discussion of the barriers related to procedural steps, perception of internal and external factors, perception of conditional factors, influence of outside players could delay or prevent the investment in renewable energy. The model will also explore how these barriers are related to investors' motivation, ability and opportunity to invest which factors are more responsible to delay or prevent the investment.

The potential contribution of this study is therefore twofold. Firstly, the factors taken in the study help us to combine several areas of research, taking into account economic, political, environmental, and marketing related issues that can work against a smooth implementation of renewable energy projects. A decision process does not occur in a vacuum, and thus relying on literature from one discipline or analyzing from one paradigm could perhaps leave out or fail to identify some crucial issues that could still have a major adverse impact on investment decisions.

Secondly, based on previous research a set of variables has been identified and conceptualized for further testing. Since the identification and conceptualization have been developed involving social, political, economic, and marketing considerations, this would provide a useful tool to quantify risk assessment related to external macro and micro environmental factors. Based on the previous research that focused on different social, political, environmental, economic, procedural and marketing related barriers, group of barriers in renewable energy has been emerged for further testing.

Finally, a research model is being proposed depicting relationships between the factors, both independent and dependent. A set of hypotheses have been proposed for testing to assess the strength of relationships between the factors within the relational model. The strength of the relationships would help us identify the key factors responsible.

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