Perception of Product and System Properties and Adoption of Ecological Products

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Abstract

Several researches have proposed models to explain the technology adoption, yet a validated model is still to be developed for explaining the adoption of 'Ecological Products'. Caird and Roy (2012) developed a model of an individual consumer's or household's decision to adopt and use ecological products and systems. It builds on Rogers' model of the innovation-decision process and employs Murphy and Cohen's classification of product properties. The model proposes the factors, socio-economic context, communication sources, consumer variables and product/system properties that adopters may consider before adopting, using or rejecting these products/systems. The paper attempts to validate the construct of Product and System properties as factor in the model.

Key Words: Eco-innovation, Consumer behavior, innovation adoption

1.   Introduction

Management of eco-innovation, as a domain has witnessed a substantial interest in the last two decades amongst the scholars across the globe; however the majority of the studies belong to the European nations. An emphasis on firm-level studies to describe and analyze relevant problems at micro level has been made to help in the formulation of macro level theory. As most recent innovations have been understood to be no longer purely policy-driven ,some of the dominant themes like 'economical' and 'ecological-intended', present in most of the definitions of green innovations, calls for an advanced understanding of the coexistence/interaction of the two(Tietze and Herstatt, 2012).

Product design, colour, size and other attributes can be some of the other factors that can deal with the pReferences towards technological products. Users keep looking for upgrading of brands, models, network providers and other mobile phone related accessories. It was also found that consumers considered color, sound, useable life, durability, size and other features while purchasing a mobile phone (Ahmed and Qazi, 2011). Malasi (2012) studied that people

seek products that have attributes that will solve their problems and fulfills their needs. Product or brand attributes such as quality, data storage features, style and design were the benefits communicated and delivered. Therefore he concluded that the product features were a competitive tool for differentiating the company's product from competitor's products and he suggested that a good design contributed to a product's usefulness as well as to its looks. Good style and design can attract attention, improve product performance, cut production costs, and give the product a strong competitive advantage in the target market.

Important determinations of laptop preference for students were price, size, processor speed and graphic card (Behzadaian, Aghdaie and Razavi 2011). Sriram, Chintagunta and Neelamegham (2006) study on cameras, found that increasing the resolution and the amount of external memory have significant positive effects on the utility of a model.

1.1 Modeling eco-innovation adoption

Substantial efforts have been done to model the innovation behavior with respect to eco-innovations ever since Rogers (1962) initially attempted to do so. The Value Belief Norm (VBN) theory proposed by Stern (1999) and the theory of planned behavior have been some of the initial works which gave the direction to thought of eco-innovation. However the 'the Model of adoption of eco-innovation' seems to have been, till now, the most comprehensive attempt to explain the adoption behavior.

1.2 Dimension identification

The earlier attempts to identify the dimensions, when compared to the 'model of adoption of eco-innovation', were limited the identification of limited number of dimensions and sub-dimensions like product attributes, attitude of the adopters, usefulness and perceived usefulness, need, ability, contextual factors etc. However, the eco-innovation adoption has been understood to have been affected by other dimensions and sub-dimensions as well like the socio-economic context: which includes factors like fuel prices, subsidy availability etc. Also another dimension of stakeholder engagement which encompasses the inter and intra level communication amongst the stakeholders.

1.3 Empirical validation of constructs.

Meade and Islam (2006) have concluded that the attempts to model eco-innovation, at consumer level, began almost three to four decade ago. Recently attempts have been done at the firm level to model eco-innovation (Cheng and Shiu, 2012) but attempts to model

consumer behavior seems to be have been limited largely innovation and therefore the scope for validating a model of eco-innovation at consumer level remains.

2. Review of Literature

2.1 Models of innovation adoption

There are various models explaining innovation adoption namely TAM, TRA, TPB, though most of them identified different factors which influence the consumer behavior in technology adoption, but they also have some similarities. They commonly propose attitude intention- behavior relationship in all the models. The fundamental belief is the cognitive and normative beliefs help in forming the attitude, which has an influence on behavioral intention and the usage of behavior. The element of 'perceived usefulness' (PU) in TAM similar to 'relative advantage' in IDT and they also have similarity with 'perceived consequences' in TRIANDIS. These primarily focus on the cognitive component of individual's attitude. The 'relative advantage', 'PU' and 'Perceived Consequences', in various models support the claim of TRA that attitude towards the behavior depends on perceived consequences. Another important element is of perceived ease of use (PEOU) in TAM which can be understood similar to the complexity construct of IDT. Ajzen (1991) claims that in TBP the 'perceived behavioral control' relates to the availability of resources and the control about the behavior and therefore it is a facilitating condition in TBP. The 'M**odel of adoption and use of ecological products and systems'** comparatively factors all the influences factored in the other models , apart from them it also considers, factors which are specific to these products like the regulations and promotion specific to adoption of eco-innovative products namely consumer variable and other socio-economic conditions, price of substitutes, role of intrapersonal communication etc. The recurring themes about eco-innovative products even in India are also centered on affordability, awareness and products etc. Mavuri (2011) has observed that the consumer buying behavior for solar products was influenced by education and income and also depends on the awareness of the customers about the solar energy products. The price sensitivity has also been observed by Vagela (1993) who also claims that education and high income have an influence on the awareness of Solar Products.

2.2 Research Model of Adoption and Use of Ecological Products and Systems

Caird and Roy (2006) proposed a model of an individual consumer's or household's decision to adopt and use ecological products and systems. The model basis itself on Rogers' model of the innovation-decision process and employs Murphy and Cohen's classification of product

properties. The model proposes the process adoption, use and rejection of such products and proposes four sets of variables that influence the process – namely, the socio-economic context, communication sources, consumer variables and product/system properties. Caird and Roy (2006) observe that price of some the energy efficient product remains an issue of concern. They also observe that, the product and system properties remain a major concern for most of the respondents and were having issue with the design and compatibility. Also the products were expected to aesthetically appealing and users expected them to better align with the other fittings of the house. It was also observed substantial changes in their product have been done at the product level still the adoption remained low. Since the model, theoretically ,appears to have substantial ability to explain eco-innovation adoption the study attempts to validate the claim that Product and System Properties have an influence on the adoption behavior.

Hypothesis H₀: The perception of product Utility, Interconnectedness, Symbolism, and Cost has a significant impact on the adoption of Ecological products.

3. Materials and Methods

3.1 Sample

The scale was adopted from the study of chakranarayan(2016).A sample of 275 respondents, comprising of adopters and rejecters of eco-innovation products was identified for the survey. In the study the researcher has identified the constructs through Review of Literature which were presented to the experts, necessary changes were made in the proposed scale items. The scale was pretested on a sample of respondents and then the results were checked for reliability and validity. After the necessary changes in wording and structure of the Schedule in the scale, the final scale contained 27 items. The sample size included n=146 Adopters and n=129 Rejecters of NRET products. As per the objective of the research, a number of steps were included in the development of the schedule. (Dilman 1978; Aaker, Kumar & Day 1998).The preparation of the schedule followed the process as suggested by Frazer and Lawley (2000) thereby proper question wording, question content development, response formatting and layout was duly paid attention to. In order to ensure the context remains the same for all the respondents Closed-ended questions were used (Gendall & Hoek 1990). The use of it reduced the interviewer bias and also assisted the respondents thinking and effort needed for answering the questions (Hair, Bush & Ortinau, 2000). Likert scale with 5 points was employed in the study. Questions were grouped as per

the construct and within the construct also were placed in a logical sequence. Binary logistic regression was applied to test the hypothesis.

4. Analysis

'A logistic regression analysis was conducted to predict 'Adoption' for 275 respondents using Utility, Interconnectedness, Symbolism, and Costas predictors. A test of the full model against a constant only model was statistically significant, indicating that the predictors as a set reliably distinguished between acceptors and decliners of the offer (chi square = 205.001, p <.000 with df = 3).Nagelkerke's R2 was .701 indicating a positive linear relationship between prediction and grouping. Prediction success overall was 85.5% (89% for adopters and 82% for rejecters). The Wald criterion demonstrated that all the factors, except 'interconnectness' made significant contribution to prediction (p: .004, .075,.002 and .000). Exp(B) value indicates that a positive raise in the perception of symbolism and cost by one unit would result in the adoption by 1.300 and 1.465 times. Therefore we partially reject the hypothesis. .

5. Conclusion

The results support the claim of the studies done earlier by Ahmed and Qazi, (2011) which concluded that the Product design, color, size and other attributes can be some of the other factors that can deal with the pReferences towards technological products. Also users constantly keep looking for upgrading of brands, models, network providers and other mobile phone related accessories. It was also concluded by them that consumers considered color, sound, useable life, durability, size and other features while purchasing innovative technology products. Similar claim has been from Malasi (2012) who had concluded studied that people seek products that have attributes that will solve their problems and fulfills their needs, therefore product features were a competitive tool for differentiating the company's product from competitor's products and he also suggested that a good design contributed to a product's usefulness as well as to its looks. Good style and design can attract attention, improve product performance, cut production costs, and give the product a strong competitive advantage in the target market. In terms of price Behzadaian, Aghdaie and Razavi (2011) concluded that for innovative technology products like laptop important determinants of laptop preference for students were price, size, processor speed and graphic.

From the marketing perspective it can be concluded that for markets like India symbolism and price remain the most dominant theme and therefore to ensure adoption of eco-innovative products offerings with aesthetically appealing looks with a complementing price tag, which ensure higher value to the customer can envisaged.

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