PREDICTING CONSUMER INNOVATIVE BEHAVIOR USING ALTERNATIVE THEORIES AND LIKELIHOOD MEASURES: A LONGITUDINAL STUDY

Heath McDonald, Deakin University, Australia
Frank Alpert, Griffith University, Australia

SUMMARY

This paper reports on a longitudinal study of consumers, where two dominant theories that purport to predict innovative behavior are applied and compared directly, using a methodology suggested as ideal by past researchers. Predictions made prior to launch were then evaluated against multiple measures of purchase likelihood, and against actual adoption behavior up to 12 months after launch. The results of this study suggest that perceptions of the innovations characteristics (PIC) predicted the self-reported likelihood of adoption better than the Domain Specific Innovativeness (DSI) scale, a personality-based measure. Prediction of actual adoption was largely inaccurate and both theories massively over predicted adoption levels, however the DSI scale was slightly more accurate. The conclusions here are that no one theory could make adequate predictions of behavior, that purchase likelihood measures are a poor substitute for measuring actual behavior but that purchase probability scales should be used more often in adoption research.

Background

Being able to predict the market reaction to a new product, prior to its launch, allows marketers to plan their tactics to achieve the optimal take-up rate and depth of market penetration (Bass 1993). Since the marketing of innovative, or very new, products are a major source of competitive advantage, a method that accurately predicted the number of likely adopters and identified those people most likely to adopt early (innovators) would be highly valuable. At present, such a methodology does not seem to exist, however there are a number of alternative theories as to what is the best way of predicting market reactions to innovative products.

The field of individual adoption research has been criticized over the last two decades for being a “malaise,” bogged down by conceptual vagueness and flawed research methods (Gatignon and Robertson 1985, p. 849). In order to guide future research efforts, this paper presents a test of the predictive abilities of a variety of the two dominant theories on what drives individual adoption behavior. Such a test of competing theories in marketing research has been strongly advocated (Armstrong, Brodie, and Parsons 2001) and given the number of plausible alternate explanations and predictive methodologies for identifying innovators, it would seem ideally suited to consumer diffusion research. This paper outlines a longitudinal study of the diffusion of one specific innovation, and compares directly the predictive ability of competing theories that purport to be able to identify the likely first purchasers (innovators) of that innovation.

Method and Results

Critics of past adoption work have attacked the use of hypothetical products and studies of already completed adoption behavior when assessing predictive theories. So as to provide a more rigorous test of these theories, a longitudinal methodology was employed here, in line with what has been deemed to be “ideal” adoption research practice (Rogers 1995). The first stage involved examining past literature to determine what the major theoretical perspectives were, and to identify the measurement instruments that best represented them. Two theoretical perspectives were found to represent the bulk of adoption work to date; one based on the personality traits of the consumer (of which Goldsmiths and Hofacker’s (1991). “Domain Specific Innovativeness” (DSI) scale was identified as the most widely used example), and the other based on consumer Perceptions of the Innovation’s Characteristics (PIC) (of which Tornatsky and Klein’s (1982) scale was chosen).

After careful screening, an innovation (a University smart card system) was selected prior to launch and adoption tracked over 20 months. The entire market for this product (661 staff members) was surveyed regarding their personal characteristics, perceptions of the product, attitudes towards adoption and purchase likelihood just prior to the launch of the product. This produced a sample (n = 228) that allowed predictions to be made based on each of the theoretical perspectives, and based on purchase likelihood (intention and probability) measures.

Both the DSI and PIC scales were reasonably good predictors of purchase likelihood measures, but in line with the findings of Ostlund (1974) and Frambach et al. (1988), the PIC scale was superior. The DSI and PIC scales predicted the purchase probability within four weeks moderately well (r² = 0.22 and 0.24 respectively) but the PIC scale gave a much stronger prediction of intention to adopt (r² = 0.18 vs. 0.33). Actual adoption of the product was then tracked progressively through until
12 months after launch, with 164 of the 228 respondents agreeing to have their actual behavior tracked. The number of staff adopting the product, and the actual individuals adopting it, were then compared to the predictions made based on each theory.

This comparison showed that both theories of adoption behavior and both purchase likelihood measures massively over-predicted the number of likely adopters at the four-week and 12-month mark (by up to 500%). Actual adoption was very low, but no theory or likelihood measure, gave any warning of this. The theories also did not accurately classify the individuals likely to adopt early. The best predicting theory, the Domain Specific Innovativeness (DSI) Scale classified 20 percent of the respondents as “innovators” whereas even after six months only 12 percent of the sample had adopted. Not only did the DSI scale overestimate the number of likely innovators, but it only classified 8/22 of those actual innovators correctly. The PIC scale fared marginally worse, with 18 percent of the respondents classified as likely innovators, but only 5/29 (17%) of those actually adopted.

Discussion

A number of conclusions can be drawn from the analysis of the predictive power of these theories. Firstly, and most importantly, no single theory has shown to be a strong predictor of the probability of adoption either within four weeks or within one year, or of a more general intention to adopt early. The DSI and PIC scales were reasonably good predictors of these purchase likelihood measures, but this bore little relation to actual adoption behavior, leaving us with the reservation that these predictions may be more statistically significant that practically meaningful. Neither theory predicted actual adoption behavior well, or gave indication that adoption levels would be low. Probability measures, however, appear to be better predictors of actual adoption behavior than intention measures. Careful framing of probability questions may further improve their accuracy. As a final note, the use of the “ideal” methodology suggested by past researchers, whilst being complex, did have substantial advantages over commonly used alternatives. While, for practical reasons, it is not always possible to undertake a longitudinal study that begins prior to launch, it should be noted that the alternatives involve large compromises that raise questions about the validity of some past studies. Longitudinal studies of actual innovations, although difficult, appear to be the only way to gain an accurate assessment of our ability to predict consumer reactions to innovative products.

REFERENCES


For further information contact:
Heath McDonald
Deakin Business School
Deakin University
336 Glenferrie Road
Malvern, Victoria
Australia, 3144
Phone: +61.3.9244.5540
Fax: +61.3.9244.5533
E-mail: heath.mcdonald@deakin.edu.au