Chapter 13
End Users’ Acceptance of Information Technology: A Rasch Analysis

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ABSTRACT

While there has been research on the diffusion of a particular type of innovation, few if any studies have examined the acceptance of a set of innovations (behavioral innovativeness) over time. This study using the Rasch methodology found evidence that computer hardware innovations are adopted in a particular order. The same could not be said for computer software, whose acceptance may be application based. This study applied a theoretical framework based on the diffusion of innovation literature (See Rodgers 1995). Data was collected via a telephone survey of 302 computer users. Scores obtained from Rasch analysis were used as the dependent variable (that of behavioral innovativeness) in a regression analysis, against factors such as overall innovativeness, use innovativeness, opinion leadership/acceptance, product class knowledge and use of sources of information. Determinates of the level of behavioral innovativeness were found to be personality traits of innovativeness, (a willingness to trial new technology) and use innovativeness (how innovatively existing information technology was used). The level of recent purchases in the last month of information technology items, a measure of leading edge use was also positively associated with acceptance of new technology. The research findings suggest that computer hardware manufacturers can assume that there is an order of acceptance of new technology and so can predict from the knowledge of existing hardware the acceptance of innovations in the future. Computer manufacturers can also effectively target early adopters of their technology given the results of this study. Rasch modeling can also be beneficial for organizations wishing to market diverse computer packages to users, as it allows a numerical scoring of a users acquisition profile or use of information technologies.
INTRODUCTION

Steenkamp, Hofstede and Wedel (1999) estimated that two thirds of new products fail, at an average cost of around $US 15 million for each such product. However, they also noted that many major companies, such as Gillette and Hewlett-Packard, rely on new products for profits and growth. Thus, consumer’s acceptance of new products is vital, which means a greater understanding of the consumer diffusion process is crucially important to many organizations.

Rogers (1958) initial research suggested the kinds of consumers who would be most willing to accept innovations and this group have generally been termed “innovators”. It is believed that such consumers influence opinion leaders who, through word of mouth, spread an innovation through a population. Innovation researchers have tended to examine this process by looking at the acceptance of one product at a time, although Midgley and Dowling (1993) were a notable exception. However, Gatignon and Robertson (1985) have argued that, for some products, such as personal computers and entertainment systems, multiple purchases are possible, as is a migration to better performing units. In such categories, the purchase of ancillary units (or perhaps software in the case of computers) is also possible. They suggested that, in such situations, research should focus on how an innovation fitted into existing consumption patterns, rather than looking at a single product’s acceptance.

The present paper is an attempt to broaden our understanding of the diffusion process by considering diffusion as a product class phenomenon. It is suggested that the acceptance of innovations within a product class depends on people’s ownership of related items within that class, although use innovativeness and past purchase behavior may influence the adoption of new items within the class (e.g., more online purchasing can lead to a demand for computer security software). These issues are addressed in the review provided in the next section.

It can be argued that consumers do not purchase individual computer items but, rather, packages of hardware and software. A good way to examine the acceptance of product class assortments or items belonging to a set of related products is to use Rasch modeling, as it models the acquisition of different technologies from established products to innovations and, consequently, this approach was used in the present study. The study also examined some of the factors that might influence the acceptance of information technologies and these factors are also discussed in the subsequent review.

A REVIEW OF RELEVANT LITERATURE

The Dependent Variable: Behavioral Innovativeness

As discussed earlier, the present study investigated the adoption of a set of innovations within a product class (see Midgley and Dowling 1978). A product class is a hierarchy of items, or units that can be purchased over time. In the case of personal computers, these units or items can be hardware, software or peripherals, such as printers and modems. Innovative behavior, or behavioral innovativeness, can be considered to be to the extent to which a user adopts most of these items, with “newer” items being the most recently purchased. However, a major problem, noted by Midgley and Dowling (1978 p. 238), is the availability of time series data through which forecasts of innovative behavior may be made. Another problem for researchers is that there is no way to predict whether innovative behavior is unidimensional, occurring in a set order across a population of interest.

Past research using cross sectional data has suggested a unidimensional order of acquisition for many consumer durables and financial assets (e.g. Kasulis et al., 1979, Clarke and Soutar,