



# The organizational adoption of high-technology products “for use” Effects of size, preferences, and radicalness of impact

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## Abstract

This research reports the results of a study on organizational adoption of high-technology products “for use” in contrast to “for manufacture.” Additionally, the study examines high-technology adoptions which often have different issues that are important to the decision process relative when compared to the adoption of less-technical products. For example, the level of compatibility or the availability of complementary products (e.g., network externality considerations) are often important issues for high-technology adoptions. As such, this study provides additional information in the relatively underresearched organizational adoption literature, particularly as it relates to high-technology products. In order to maintain connectivity with past work, we look at the firm size versus adoption issue. At the same time, we add new information by also examining how organizational preferences for products, and the degree of radicalness of the products affect organizational adoption. We use a proportional-hazards model to test our hypotheses using panel data on 400 firms that are drawn from 14 industries. As part of the research effort we developed an improved scale for judging the radicalness of a product than has been used in prior research. Furthermore, we extended the Booz, Allen, & Hamilton *New Product Categories* (1982) approach to incorporate innovation impact. As expected, the results show that size “does matter,” but that it is modified by degree of product radicalness and organizational preference. Interestingly, we found that for high-technology products “for use,” organizations prefer radical impact products but adopt incremental impact products. Hence, preferences and purchase behaviors do not match. © 2002 Elsevier Science Inc. All rights reserved.

*Keywords:* Organization adoption; High-technology products; Innovation radicalness; Organizational preferences; Organization size

## 1. Introduction

A large and growing new class of high-technology products seem to be driving the economy. In fact, the stock market seems to turn on the ebbs and flows of high-technology-related stocks. However, for these types of products there are issues central to the adoption decision that are often of less or no importance when considering the purchase of other common products like food items, clothing, entertainment, and the like. For example, a key issue for high-technology adoptions is often the level of compatibility a given product has with other products. This may be in the terms of products that are currently owned (legacy products), or the availability of complimentary products, which

help to make the product more useful to the organization. For some high-technology products, the eventual adoption and diffusion in consumer markets occur after organizations adopt these products first. In such cases, the organization provides employee access and training on the new high-technology product early in the life cycle. This allows employees to gain low cost learning, experience, and understanding of the product’s benefits. In effect, this helps complete the early steps of the adoption process (in a hierarchy of effects sense). It can be argued that the diffusion of PC’s and key software packages in consumer markets depended, in no small way, on earlier corporate and organizational adoptions which provided easy access to the technology when it was fairly costly.

The number of studies relating to high-technology products has increased as technology and information management have gained in importance in the workplace. Previous studies of high-technology products have focused on the diffusion and assimilation of technology throughout the

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organization [33,38,49,72]. However, the number of studies focusing on organizational *adoption* of such products has been limited.

This is particularly true in situations where high-technology products are adopted “for use” rather than “for manufacture.” We distinguish between “for use” and “for manufacture” as follows. Purchases “for manufacture” are those that relate to the making or producing of the organization’s product(s) (e.g., new extrusion equipment). On the other hand, “for use” purchases are those that relate to the operation of the organization, but are not tied directly to the making or producing of the product (e.g., phones, paper clips, desks, or chairs). Clearly, one can argue that purchases that improve the operations of the business impact the production of the product. Hence, the purchase of paper clips, pens, and so forth by Intel are clearly distinct from a new kind of machine which produces integrated circuits faster. The issue here is to distinguish between the two major purchase types made by organizations along a “for manufacture” and “for use” dimension.

One of the more widely debated topics in the organizational microlevel diffusion literature is the role of firm size on the innovation adoption process. We note that in this literature most microdiffusion studies interpret “innovation adoption” or “innovative activity” as the commercialization of new products or processes. Typically, this literature has focused on the relationship between adoption and firm size from an innovation “for manufacture” perspective (see Refs. [19,32,39,43,44,55,73]).

Most studies of organizational adoption of innovations have found that large firms are more likely than smaller firms to be early adopters because of greater slack resources [8,31,39,45,60–63]. However, an important minority view has surfaced that argues that (1) smaller firms are more likely to be early adopters because of their desire to become more competitive with larger firms, and (2) a large firm’s bureaucracy tends to slow the adoption process down [42,47].

In response to these divergent views, some researchers have more recently suggested that this issue is too complex to allow for a single sweeping statement concerning the relationship between innovation adoption and firm size [27,48,58]. Scherer [60, p. 418] argues that “the search for firm size uniquely and unambiguously optimal for invention and innovation is misguided.” Two middle-range theories have resulted in attempts to reconcile the contradictory findings in the literature. The first theory suggests that the relationship between firm size and adoption is nonlinear in the form of an inverted U-shape shown in Fig. 1. The second theory suggests that the impact of the innovation (i.e., radical or incremental) moderates the size innovation–adoption relationship [27].

This study looks at organizational adoption of high-technology products “for use.” Using these two theories as a base, we look at how firm size and organizational preferences affect the timing of adoption of technological

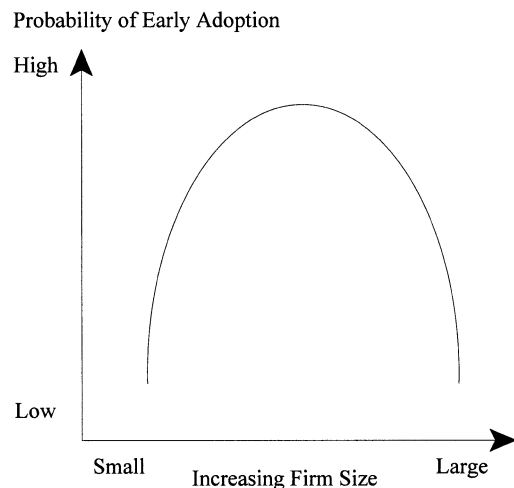


Fig. 1. Inverted U hypothesis.

innovation at the individual firm level, given the potential moderating influences of firm size and technological impact. Data on 10 high-technology product innovations “for use,” classified as having radical, semiradical, or incremental impact were used for the analysis. In what follows we present four hypotheses, the model and methodology for analysis of collected data, a discussion of our results, and the managerial implications that follow from our findings.

## 2. Hypotheses

The research hypotheses that follow were developed from a review of the microlevel diffusion models and the impact-of-innovations literatures. Since there are few studies on organizational adoption of high-technology products “for use,” we have developed fairly straightforward hypotheses. This allows for a more direct comparison with other studies of high-technology products where organizational adoption “for manufacture” is of interest. Where possible the hypotheses are stated in the form supported by the literature.

### 2.1. Hypothesis 1

*Hypothesis 1:* Organizational size is positively associated with the adoption of high-technology product innovations for use.

The majority of research in the organizational theory and economics literatures has found that large firms are more likely to adopt innovations earlier than smaller firms. This finding holds true for both innovation-for-manufacture [20,42,44] and innovation-for-use [16,34,45]. The primary reason for this relationship given in the literature is that larger firms are able to adopt earlier because of abundant slack resources such as money, people, and facilities [3,10]. A second explanation is that larger firms

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