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A taxonomy of information technology-enhanced pricing strategies☆

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Abstract

As a result of evolving technology, opportunities for innovative pricing strategies continuously emerge. The authors provide an updated taxonomy to show how such emerging strategies relate to recent technological advances. Specifically, they cite increased availability of information, enhanced reach, and expanded interactivity as three technological advancements and identify six pricing strategies enhanced by these factors. They also discuss the role of utility, prospect, range, and signaling theories for emerging pricing strategies, along with several applications and managerial implications.

Keywords: Pricing; Taxonomy; Internet; Auctions; Strategy

A pricing strategy represents a reasoned choice from a set of alternative prices (or price schedules) targeted to meet firm objectives during a planning period in response to a given scenario (Tellis, 1986). The strategy relies on extensive industry analyses that assess the nature and complexity of available products, consumers, competitors, suppliers, and market structures (see Monroe, 2003; Nagle and Holden, 2002).

Recent advances in information technology (IT), such as digital products, real time computational abilities, intelligent agent technologies, and database marketing, have opened a vast array of pricing possibilities (Bakos and Brynjolfsson, 1999; Iyer and Pazgal, 2003; Jap, 2003). Decreasing search costs and marginal costs of information goods, along with increasing Internet risk perceptions, challenge the direct applicability of long-standing pricing strategies (Bakos and Brynjolfsson, 1999) and encourage previously infeasible, innovative pricing strategies (Biswas and Krishnan, 2004).

Nonetheless, the variety of labels associated with these innovative pricing strategies enhances the complexity of this discussion, so managers have trouble identifying and applying appropriate strategies. As Marn et al. (2004, p. xi) note,

> Even thoughtful general managers feel helpless to make real progress on the pricing front. They do not even know where to begin to get a handle on identifying—much less capturing—the exciting performance upside that pricing often holds.

The IT revolution has advanced the scope of pricing strategies to the point that an updated taxonomy is both appropriate and timely. In addition, the wealth of recent academic articles on innovative pricing strategies necessitates a logically derived structure and greater integration. Although some authors (e.g., Dixit et al., 2005) discuss IT-enhanced pricing strategies (ITEPS), the literature contains no updated taxonomy. This research differs from and expands upon previous research. For example, Dixit et al. (2005) primarily focus on policy implications and provide cases and company examples. The main focus of this paper is to expand upon Tellis's (1986) pricing classifications by updating it to reflect the recent IT revolution. Furthermore, this article contains a review of extant research and thus provides a conceptual framework for the emergence of ITEPS. Specifically, it includes discussions of utility, prospect, range, and signaling theories in the context of emerging pricing strategies (Kahneman and Tversky, 1979; Spence, 1974; Thaler, 1985).

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In summary, this research creates a revised taxonomy of pricing strategies that considers recent developments, including increased availability of information, enhanced reach, and expanded interactivity, and identifies six pricing strategies that have surfaced in response.

1. Influence of information technology on pricing strategies

Marketplaces in the 21st century contain various IT innovations, and the Internet has prompted many changes in business (Smith and Brynjolfsson, 2001). This research concentrates on three underlying factors that influence pricing: (1) increased availability of information, (2) enhanced reach, and (3) expanding interactivity (Hoffman and Novak, 1996).

1.1. Increased information availability

Information technology improves the gathering, handling, and analysis of pricing information. Availability of tremendous amounts of data (both online and offline; e.g., scanner data) enable firms to implement segment-based pricing, that is, determine an optimal price for each segment. With choice data, managers can microsegment a market on the basis of consumers' heterogeneity relative to their reservation, reference, and expected prices, as well as their price sensitivity and brand utility.

Increased customer and competitor information also can increase price discrimination by enabling better demand forecasting. More sophisticated search tools give firms (rather than customers) better information about costs and prices. If used correctly, price transparency can favor those with greater access to search resources. The high prices companies such as Amazon.com and AOL pay for search bots such as Jango and Junglee confirm the important roles these tools may play in future business transactions(www.softwareview.com/thesof29.htm).

Technology advancements also can apply thousands of pricing algorithms in a matter of milliseconds to develop customized prices and discounts and provide a competitive edge to firms. Increased information gathering, handling, and analysis capabilities enhance price customization, bundling and unbundling, revenue management, and automated pricing strategies.

1.2. Enhanced reach

Enhanced reach catalyzes various pricing strategies (e.g., auctions, revenue management, bundling/unbundling, price customization); in particular, the Internet provides companies access to an extended universe of customers, more demand, and new markets. Enhanced reach increases the popularity of online auctions that create a vast secondary market, unlimited by geography, time, or space. In this marketplace, not only do firms compete for consumer patronage, but consumers compete for a specific offering. Multiple customers from different geographic regions can participate in a single auction, and automated, intelligent agents enable single customers to monitor and participate simultaneously in several auctions. This larger pool of customers effectively increases demand, opens new markets, alters consumer behavior, and affects the valuation of products. According to some estimates, "Prices for hot (high demand) products are 17% to 45% higher on-line than off because the web increases the likelihood of finding a buyer willing to pay a higher price" (Baker et al., 2001, p. 124).

1.3. Expanding interactivity

Information technology may increase efficiency through electronic transactions and online customer interactions, which can affect pricing by creating exchanges (or online trading mechanisms), such as maintenance, repair, and operations hubs (e.g., Transora), through which buyers and sellers group together. Two models—*matching* buyers and suppliers and *demand aggregation*—result in a better price for buyers and more volume for suppliers, a win–win situation. Heyman et al. (2004) discuss product valuation in online auctions in terms of opponent effects and quasi-endowments; the former involves the value of winning a bidding competition, whereas the latter refers to a sense of ownership/involvement that bidders develop during an auction. These dynamic effects can lead to behaviors that may differ from those of traditional purchase situations.

As customers become more sophisticated in their use of search agents (e.g., shopping bots), the resulting ease of price comparisons may make buyers more deal prone. Pricing managers can address this issue through various pricing mechanisms such as versioning (Shapiro and Varian, 1999; Varian, 1995), auctions, or group buying programs (Anand and Aron, 2003) to increase the overall value they offer to customers. For example, revenue management may clear the market surplus so the firm can distribute excess capacity by offering different prices to different customer segments. Bundling products and services may reduce production and distribution costs.

In summary, the combination of increased information, enhanced reach, and expanded interactivity prompts pricing strategies such as auctions, bundling, revenue management, signaling, automated pricing, and price customization, as depicted in Fig. 1.

2. Theoretical perspectives

To apply ITEPS, managers need a clear understanding of underlying price theories. In this section we briefly discuss utility theory, prospect theory, range theory, and signaling theory as four underlying price theories and their applications to ITEPS. According to the utility theory, consumers are utility maximizers, and their willingness to pay depends on the specialization or acuteness of their need. Therefore, utility theory might play an increasingly important role in determining prices compared with, say, expected cost minimization. Revenue management, auctions, and customization exploit consumers' utility differences for a certain product or service, and versioning, a special case of customization, offers information goods in different versions (or models/descriptions/editions) to appeal to different customer segments. For example, basic software, though perfectly suitable for some segments, has less utility for others. Customers reveal their