STRATEGIC USE OF BUNDLING FOR REDUCING CONSUMERS' PERCEIVED RISK ASSOCIATED WITH THE PURCHASE OF NEW HIGH-TECH PRODUCTS

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Consumers' perceived risk is a significant barrier to the adoption of new high-tech products. Based on a review of the marketing, consumer behavior and psychology literatures, a theoretical framework is developed here that suggests how bundling a new high-tech product with an existing technology could help reduce consumers' perceived risk associated with the purchase of the new high-tech product. This manuscript also explores what factors influence consumers' risk perception when a product bundle is available. Managers might use this framework to develop bundling strategies for high-tech products, and to understand what factors make such bundles more attractive.

INTRODUCTION

Consumers perceive the purchase of a new high-tech product to be a risky decision because high-technological (high-tech) products and industries exhibit pervasive technological and market uncertainties (Davidow 1986; Moriarty and Kosnik 1989; Mohr 2001). The uncertainties include doubts about product reliability and performance as well as questions about the market acceptance of a new technology. In addition,

consumers are concerned about rapid obsolescence and depreciation of high-tech products (Dhebar 1996).

Mohr (2001) notes that high-tech markets exhibit significant competitive volatility, characterized by a high turnover in industry players and bases for competition. As a result, the credibility, stability and long-term viability of vendors offer an additional area of concern to high-tech customers (Moriarty and Kosnik 1989; Mohr 2001). Marked by frequent turbulence and market disruptions, many high-tech industries display signs of hypercompetition (D'Aveni 1994), adding to the consumer's anxiety and perceptions of risk.

High-tech products generally do not function in isolation. They either need complementary products to function effectively, or they act as complementary products to others (Cohan 1997; Davidow 1986; Kim and Mauborgne 1999; Mohr 2001). Therefore, when purchasing high-tech products, consumers are subject to additional worries about the availability of complementary products and the compatibility between parts of a product system.

Consumers can mitigate these concerns by purchasing products that either conform to, or set the dominant standard in an industry. However, in the early stages of the product life cycle, predicting whether or not a new technology is likely to become an industry standard is difficult (Coyne and Dye 1998; Hill 1997). Many high-tech products are subject to the increasing-returns effect whereby an increase in the number of people using the product leads to the product becoming more valuable to current and potential users. Once the user base of a product begins to grow, it feeds on itself to keep on growing, giving the technology a high probability of attaining a favorable position in the market (Hill 1997; Shapiro and Varian 1999). While increasing the rate of market acceptance is important to all products, it seems to be particularly important to increasing-returns-based high-tech products, where the need to jump-start the user base early in the product life cycle is critical.

This argument suggests the value of acquiring and retaining early adopters (as opposed to later adopters) on the overall profitability of a new high-tech product (Hogan, Lemon and Libai 2002). However, the diffusion of innovations literature (i.e., Mahajan, Muller and Bass 1990; Rogers 1983; Ostlund 1974) suggests that product adoption is less likely if adopters perceive risks associated with the new technology. Consumers stand to incur a considerable loss, in terms of financial, learning, and opportunity costs, if an incompatible alternative technology (other than the one purchased) comes to dominate the market (Shapiro and Varian 1999; Hill 1997).

Characteristics of high-tech product markets discussed thus far raise the risk associated with the purchase of a new technology (Dhebar 1996). In the consumer behavior literature, perceived risk is commonly defined in terms of consumer perceptions of the probability and magnitude of potential negative consequences resulting from a purchase. Dowling and Staelin (1994) argue that "these two aspects of a purchase situation [probability and magnitude] are mapped into the construct of perceived risk" (p. 120). Consequences might include monetary loss, loss of social status, product performance, physical harm or injury, psychological loss, loss of future opportunity, and/or time lost (Kaplan, Szybillo and Jacoby 1974). In this paper, risk will be explored as a global assessment of the probability and magnitude of potential negative consequences resulting from the purchase of a product offering.

Risk may lead to consumer anxiety (Mitchell and Greatorex 1993), and may cause the consumer to delay, defer or cancel the product purchase (Dhebar 1996; Mohr 2001). To increase the rate of adoption of new high-tech products, marketers need to develop strategies for reducing consumers' perceived risk (Deering and Jacoby 1972). In this manuscript, we propose that marketers can use product bundling strategies to lower this perception of risk.

This manuscript seeks to extend bundling literature into risk reduction in the context of new high-tech product introductions. Based on the premise that consumers' perceived risk associated with a product offering has a negative relationship with consumers' intention to buy (Holak and Lehman 1990), we propose a theoretical framework that explores what factors in a product bundle may help reduce consumers' perceived risk. Propositions are offered that relate to brand credibility for both new high-tech and established products, level of innovation, bundle positioning and bundle discounts. In the interest of parsimony, propositions refer to two-product bundles. The final section of the manuscript presents conclusions, and managerial implications of this strategy.

BUNDLING AND HIGH-TECH PRODUCTS

Product bundling has been variously defined as selling goods in packages (Adams and Yellen 1976), marketing two or more products/services in a single package for a special price (Guiltinan 1987), and selling two or more products/services at a single price (Yadav and Monroe 1993). Stremersch and Tellis (2002) define bundling as "the sale of two or more separate products in one package" (p. 56), with "separate products" defined as products for which separate markets exist. For example, a combined offering of a cellular phone, a personal digital assistant (PDA) and wireless service is a bundle because at least some consumers would buy cellular phones, PDAs and wireless services separately if they were so available. In practice, bundles are often offered at a discount off the summative price of the bundled components. Thus, bundles might offer value added through the integration of products in the bundle ("product bundling"), and/or through bundle discounts ("price bundling," Stremersch and Tellis 2002). Price bundling is a price promotional tool, while product bundling is a marketing strategy for packaging

complementary or related products. Previous bundling research has tended to focus on price bundling rather than product bundling. The use of bundling to market new high-tech product remains largely unexplored (Stremersch and Tellis 2002).

Bundling strategies have been used extensively because of benefits to both sellers and consumers. Sellers use bundling as a competitive strategy to increase demand for an entire product line (Monroe 1990), to build new markets (Ovans 1997), to enhance a market position (Lawless 1991), and to differentiate themselves from competitors (Porter 1980). In addition, product bundling can reduce production, carrying and shipping costs (Monroe 1990; Eppen, Hanson and Martin 1991). Price bundling can function as a price discrimination device (Stigler 1968), allowing sellers to segment the market based on consumers' reservation prices (i.e., the price a consumer is willing to pay; Adams and Yellen 1976; Nagle 1984).

Price bundling can stimulate consumers to buy a bundle of a seller's products when they would have otherwise purchased a single component; thus, sellers can experience increased profits due to a higher volume of sales. However, bundling is effective only when it does not attempt to coerce buyers to buy something they do not want (Yadav 1995). This study advocates the use of bundling to offer consumers incentives to overcome their hesitancy related to the purchase of new high-tech products (i.e., those that they are already interested in), due to the perceived risks associated with the purchase.

Sellers can also use bundling to send signals the market to publicize their strengths and reduce uncertainty (Robertson 1993). New high-tech products could be bundled with established technologies or brands to signal consumers regarding the reliability and quality of the new technology. Bundling a new high-tech product with complementary products would signal the availability of complementary products, compatibility between products, and conformance to a common technological standard. These different bundle configurations are all designed to aim at the core of issues affecting perceived risk in high-tech markets.

Price bundling obviously benefits consumers by providing monetary savings (Yadav and Monroe 1993; Estelami 1999). On the other hand, product bundling benefits consumers by reducing the time and cognitive effort required to make purchase decisions, a benefit that is particularly relevant when purchasing an unfamiliar high-tech product (Moriarty and Kosnik 1989). Product bundles can replace several confusing options with simpler ones (Ovans 1997). For example, AT&T offers to bundle local phone service, long-distance phone service, cellular phone service, paging and Internet access in a single package with a single monthly bill (Blumenstein 1999).

The previous literature on consumers' perceptions of bundles is grounded in prospect theory (Kahneman and Tversky 1979) and mental accounting (Thaler 1985). This literature suggests that in risky situations, consumers are more sensitive to possible losses than to possible gains, and that they are likely to accept more risk when potential losses are aggregated. Losses are aggregated when several losses are summed and presented as a single unit. For example, if an investor sees losses in a portfolio only once after three months (e.g., in a quarterly financial statement), he/she will be more willing to take risks than if he/she saw the same losses with greater frequency (e.g., by reviewing the portfolio daily or weekly). The principle of aggregated losses suggests that bundling several otherwise risky products together might reduce perceived risk as the bundle would offer several distinct benefits (gains) for one price (loss).

Thaler (1985) and Kaicker, Bearden and Manning (1995) explore how bundling helps consumers make risk-return tradeoffs. When a set of alternatives includes a mix of more preferable (e.g., credible brand, price promotion) and less preferable attributes (e.g., high price, unproven technology), consumers may choose by trading off conflicting attributes. When two products are offered in a successful bundle, the perceived risk from one product is cancelled with the perceived gain from another product, often resulting in an overall gain from the combination.

Even when two risky products are bundled together, a consumer may perceive less risk associated with the bundled purchase over the purchase of separate products. In such a bundle, potential losses are aggregated, and perceived risk is lessened based on consumer attributions about products in bundles. A bundle may serve as a signal or cue leading consumers to perceive that products in the bundle are complementary, of similar quality, of high quality, and/or targeted to the same consumer segment. Therefore, we propose:

P1: All else being equal, consumers' perceived risk will be lower when a new high-tech product is offered in a bundle than when it is offered as an individual product.

Thus, regardless of the attributes, a new high-tech product is likely to be perceived as a higher risk purchase when sold as an individual (stand alone) product, as compared to the same product being sold in a bundle. However, not all product bundles are likely to be equally successful in reducing the perceived risk of the consumers. Thus, building on the basic premise established in proposition 1, we next explore which bundle configurations more likely to reduce consumer's perceived risk than others.

BRAND OF THE NEW PRODUCT AND THE ESTABLISHED PRODUCT IN THE BUNDLE

Brands function as powerful heuristic devices that consumers use to evaluate products and reduce decision effort (Bauer 1960; Park and Lessig 1981). A brand name can serve as a

signal for product quality when product quality is unknown or unobservable (Rao, Qu and Ruekert 1999). The halo effect, which is the tendency to evaluate specific attributes according to the general impression of the object being rated (Thorndike 1997), may cause a consumer to generalize positive attributes to a new product when that product is offered under a credible brand name (Bass and Talarzyk 1972). Simonin and Ruth (1995) found that prior attitudes toward brands of products (new and established) in a bundle significantly affect attitudes toward the bundle, which in turn predict the price consumers are willing to pay for the bundle.

Credibility refers to the extent to which a source is perceived as expert and trustworthy. The concept has long been applied to research on source image and spokespersons. More recently, it has been applied to the study of corporations (e.g., Goldsmith, Lafferty and Newell 2000) and brands (Erdem, Swait and Louviere 2002). When applied to brands, some scholars refer to this construct as brand reputation (e.g., Chaudhuri 2002).

Consumers may rely on credible brands as a risk-reduction strategy for high-tech products because many consumers either have incomplete information or may not fully understand the technologies inherent in the products that they are buying. In high-tech markets, companies like Microsoft, Intel, Hewlett-Packard, and 3-Com use strong branding strategies in part to alleviate consumer anxiety (Morris 1996). Thus, one could expect to see the following effect in the sale of individual high-tech products:

P2: All else being equal, consumers' perceived risk associated with the purchase of a new high-tech product will be lower when the *high-tech product* has a *more credible brand* name than when it has a *less credible brand* name.

Further, consumers may make evaluations based on combinations of branded products. Brand alliances are analogous to product bundles in that one product lends assurances to another product (Guiltinan 1987). In some circumstances, an alliance of two existing brand names provides greater assurances about product quality than does one brand alone (Park, Jun, and Shocker 1996). The presence of a credible brand name in an alliance may signal to potential consumers that a credible firm is willing to stake its reputation on the other product. Consumers are likely to assume that marketers of a high-quality brand will ally the brand only with other high-quality products in order to avoid damaging the brand's reputation (Rao and Ruekert 1994).

In their study of branded components in bundles, Venkatesh and Mahajan (1997) found asymmetry in value added by branding different components; specifically, the perceived value added by putting the Intel brand name on computer chips suppressed the effect of putting the Compaq brand name on personal computers. Their results suggest that the Intel component is a critical component, and the added effect of branding the product (Compaq) was minimal.

In the context of two separate products in a bundle, the existence of a credible brand name among either of the products in a bundle is likely to reduce perceived risk associated with a bundle purchase. When bundling a high-tech product innovation with an established product (i.e., a product that is familiar to the consumer and which uses a standard, reliable technology), a consumer may invest more trust in the branding of an established product in the bundle. The effect on perceived risk of the new high-tech product brand (credible vs. less credible) may be stronger when paired with a less credible established product (vs. a more credible established product). Assuming a bundle of a new high-tech product and an established product, we offer the following propositions:

P3a: All else being equal, consumers' perceived risk associated with the purchase of a new high-tech product will be lower when at least one of the products in the bundle has a credible brand name, than when neither product has a credible brand name.

P3b: All else being equal, compared to other combinations of brands in a two-product bundle, consumers' perceived risk will be lowest when both products have credible brand names.

P3c: All else being equal, the negative relationship between the brand credibility of a new high-tech product and perceived risk will be stronger when the high-tech product is bundled with an *established product* that has a *less credible brand* than when it is bundled with an *established product* that has a *more credible brand*.

For illustrative purposes, the potential effect of branding new high-tech and established products in a bundle on consumer's perceived risk (P3c) is graphed in Figure 1, Part A.

LEVEL OF INNOVATION OF THE NEW HIGH-TECH PRODUCT

Innovation has long been of great interest to researchers. Over the years, researchers have used different terminology to define incremental/continuous and radical/discontinuous innovations. For example, the technology management literature (e.g., Foster 1986) suggests that the relationship between effort spent developing a technology or product, and the benefits derived from it resembles an S-shaped curve; initially the benefit received from a technology (relative to the effort) is slow initially, accelerates as the technology advances, and finally slows down as a technology matures.

Technologies ride this S-shaped curve by making incremental improvements. However, the incremental improvements ultimately begin to yield diminishing returns. At such a point, a new technology based on a new knowledge base may emerge and introduce a 'discontinuity' in the market by introducing a radical innovation--thus starting a new S-shaped technology curve (Foster 1986). Similarly, Sneep (1992) regards radical innovations as those that originate a product life cycle, as opposed to incremental innovations that are derived from an existing product life cycle.

Other researchers (i.e., Tushman and Anderson 1986; Anderson and Tushman 1990) also proposed that technologies evolve in a cyclical manner with periods of incremental change punctuated by technological breakthroughs. Tushman and Anderson further suggest that radical innovations represent a technological advance so significant that no increase in scale, efficiency or design of the older technology can make it competitive with the new technology (Tushman and Anderson 1986). Recent research has described radical/discontinuous innovations as those that deliver either five to ten times improvement in performance over existing products, or create a basis for thirty to fifty percent reduction in cost, or introduce new to the world performance features (Rice et al. 1998).

Other researchers describe the discontinuous nature of an innovation in terms of newness of features. For example, O'Connor (1998) defines radical innovation as the creation of a line of business, which is new to both the firm and the marketplace. Yet others regard discontinuous innovations as products that incorporate a substantially different core technology and provide substantially higher customer benefits relative to previous products in the industry (Chandy and Tellis 1998; 2000).

Veryzer (1998) suggests that consumers are required to compare relative advantage (comparisons among similar products or features) when assessing incremental innovations, while they are required to compare differential advantage (comparisons among divergent products or features) when assessing radical innovations. After analyzing consumer research projects in multiple product development cases, Veryzer concluded that consumers are more accustomed to assessing relative advantage rather than differential advantage. Thus from the consumer's perspective, radical innovations present greater risk than incremental innovations (Crawford 1983). When considered on a continuum, the level of innovation represents a degree of newness presented by the product (Sarin and Mahajan 2001). A high level of innovation is likely to present greater performance risk and potential for time loss to the consumers than low levels of innovation. Therefore, we propose:

P4: All else being equal, consumers' perceived risk associated with the purchase of new high-tech product will be lower when the high-tech product introduces a low level of innovation than when it introduces a high level of innovation.

As the level of innovation increases, the uncertainty and risk associated with the purchase of the new high-tech product may increase because consumers will not fully understand the technology or the new product features. In such circumstances, consumers might rely on heuristics like a credible brand name for assurance. When a highly innovative product is included in a bundle, a consumer may invest more trust in the credibility of the brands in the bundle; thus, the effect of level of innovation (low vs. high) on perceived risk may be stronger when the innovative product is bundled with a less credible brand. That is, brand credibility may moderate the effect of innovation level on the perceived risk. Similar effects may be seen when a highly innovative product is bundled with an established product; the consumers may invest more trust in the reliability of the established product. The established product is likely to moderate the relationship between the level of innovation and perceived risk. This suggests the following propositions:

P5a: All else being equal, the positive relationship between innovation level and perceived risk will be weaker when the new *high-tech product* in the bundle has a *more credible brand* name than when it has a *less credible brand* name.

P5b: All else being equal, the positive relationship between innovation level and perceived risk will be weaker when the new high-tech product is bundled with *an established product* having a *more credible brand* name than when it is bundled with an *established product* having a *less credible brand* name.

For illustrative purposes, the potential effect on perceived risk of level of innovation and bundle branding (P5a and P5b) are graphed in Figure 1, Part B.

POSITION OF THE NEW HIGH-TECH PRODUCT IN THE BUNDLE

Anchoring and adjustment heuristics suggest that consumers assign more importance to one item in a bundle (i.e., the "anchor") and they make their decision based on their evaluation of this anchor (Tversky and Kahneman 1974; Yadav 1994). The other, secondary product in the bundle tends to be regarded as a tie-in product to this anchor. As they assign more relative weight to the value of the anchor, consumers may also assign it more risk. The importance or weight assigned to each product in the bundle may derive from its monetary cost, or centrality to a consumer's identity, image, lifestyle or livelihood. The bundle anchor is the

product to which greater importance is attributed, and the bundle tie-in is the product to which less importance is attributed.

Product bundles can be designed such that a new high-tech product is either positioned as the anchor or as the tie-in. For example, in a bundle consisting of a personal digital assistant (PDA) and a cell phone, most consumers would think of the PDA as the anchor; however, in a bundle consisting of the same PDA and a laptop computer, most consumers would now think of the PDA as a tie-in. Designing a bundle with an established product as an anchor and a new high-tech product as a tie-in may help lower the risk perception of the new product. Therefore, we propose:

P6: All else being equal, consumers' perceived risk associated with the purchase of a new high-tech product will be lower when the new *high-tech product* is offered as a *tie-in product* in the bundle than when it is offered as an *anchor product* in the bundle.

When one of the brands in the bundle is perceived to be highly credible, consumers may trust the brand and generalize that trust to the new high-tech product regardless of whether the high-tech product is the anchor or the tie-in. Thus, the effect of bundle position (anchor vs. tie-in) on perceived risk of a new high-tech product may be weaker when one of the products in the bundle is a credible brand. As such, brand credibility may moderate the effect of bundle positioning on perceived risk. This suggests the following propositions:

P7a: All else being equal, the effect of the position (anchor vs. tie-in) of the new high-tech product in the bundle on perceived risk will be weaker when the *high-tech product* has a *more credible brand* name than when it has a *less credible brand* name.

P7b: All else being equal, the effect of the position (anchor vs. tie-in) of the new high-tech product in the bundle on perceived risk will be weaker when the *established product* has a *more credible brand* name than when the *established product* has a *less credible brand* name.

For illustrative purposes, the potential effect on perceived risk of bundling positioning and branding (P7a and P7b) is graphed in Figure 1, Part C.

Further, consumer decisions may be affected by the interaction between level of innovation and position of the new high-tech product in a bundle. Since consumers assign more evaluative weight to an anchor, offering an anchor with a low level of innovation may lower consumers' perceived risk. Consumers' risk perception with a tie-in product that has low level of innovation might not differ much from one with a high level of innovation because of the relatively low evaluative weight assigned to the tie-in. Thus, level of innovation may moderate the effect of bundle positioning on perceived risk. This suggests the following proposition:

P7c: All else being equal, the effect of the new high-tech product's bundle position (anchor vs. tie-in) on perceived risk will be stronger when the new *high-tech product* introduces *high level of innovation* than when it introduces a *low level of innovation*.

For illustrative purposes, the potential effect on perceived risk of level of innovation and bundle positioning (P7c) is graphed in Figure 1, Part D.

BUNDLE DISCOUNT

Adoption of innovations can be influenced by economic constraints. Consumers may delay adopting a new product because they feel its price is too high (Robinson and LaKhani 1975), or they expect its price to fall (Holak, Lehmann, and Sultan 1987; Narasimhan 1989). Under such conditions, consumers prefer to wait and see results from others who can afford to take economic risk (Sheth 1968). Previous research suggests a relationship between price and perceived risk in two directions. Roselius (1971) suggests that consumers may buy a more expensive product because they perceive less risk based on price-quality association. Alternatively, others argue that price acts as a constraint to purchase and represents a financial risk (e.g., Bettman 1973; Kaplan, Szybillo, and Jacoby 1974).

A bundle discount is one form of price promotion. Marketers typically rely on price promotions to induce trial among nonusers, to increase purchase volume, and/or to retain current consumers who might otherwise switch brands. In high-tech markets, price bundling has been suggested as a critical strategy for achieving market penetration (Stremersch and Tellis 2002). Some consumers may question product quality when a high discount is offered. However, in the context of a new product introduction, consumers may interpret a bundling discount as a promotion for a trial period rather than an indicator of poor quality. Moreover, a bundle discount offers a greater risk-return tradeoff to the customers and lowers their financial risk. This leads to the following proposition:

P8: All else being equal, consumers' perceived risk associated with the purchase of a new high-tech product will be lower when the new *high-tech product bundle* is offered *with a discount* than when the bundle is offered with *no discount*.

Monroe and Krishnan's (1985) meta-analysis shows that consumers evaluate products more positively when price and brand are presented together than when price is presented alone. Blattberg and Wisniewski (1989) found that consumers

who buy lower-priced, lower-quality brands will switch to higher-priced, higher-quality brands when both brands give the same discount. These studies suggest that branding and pricing may interact to effect consumer perceptions of quality and value.

In the context of a new high-tech product bundle, consumers may feel most confident about a new high-tech product when the bundle includes a credible brand and is offered at a discount. A discount in the absence of a credible brand may suggest low quality, and thus high risk. When no discount is offered, the bundle presents a greater financial risk to the consumers, and may not offer them an attractive risk-return tradeoff. This suggests the following propositions:

P9a: All else being equal, the negative relationship between bundle discount and perceived risk will be stronger when the *high-tech product* in the bundle has a *more credible brand* name than when it has a *less credible brand* name.

P9b: All else being equal, the negative relationship between bundle discount and perceived risk will be stronger when the *established product* in the bundle has a *more credible brand* name than when it has a *less credible brand* name.

For illustrative purposes, the potential effects of bundle discount and bundle branding on perceived risk (P9a and P9b) are graphed in Figure 1, Part E.

Furthermore, consumers may trade off risks associated with radical innovations with gains associated with price discounts. In the context of an incremental innovation, a discount may reduce perceived risk very little as risk is already relatively low and consumers may assume a positive price-quality relationship. In the context of a more radical innovation, consumers may perceive high performance and financial risks. In such cases, a discount would reduce financial risk for the consumer. For market-savvy consumers, discounting a higher level of innovation might help improve the risk-return tradeoffs, and help reduce perceived performance risk as consumers are likely to attribute a discount to a marketer's objective of stimulating trial (i.e., the promotional discount demonstrates the marketer's faith in the product's potential). This suggests the following proposition:

P9c: All else being equal, the negative relationship between bundle discount and perceived risk will be stronger when the high-tech product has a *high level of innovation* than when it has a *low level of innovation*.

For illustrative purposes, the potential effects of level of innovation and bundle discount on perceived risk (P9c) is graphed in Figure 1, Part F.

CONCLUSIONS AND IMPLICATIONS

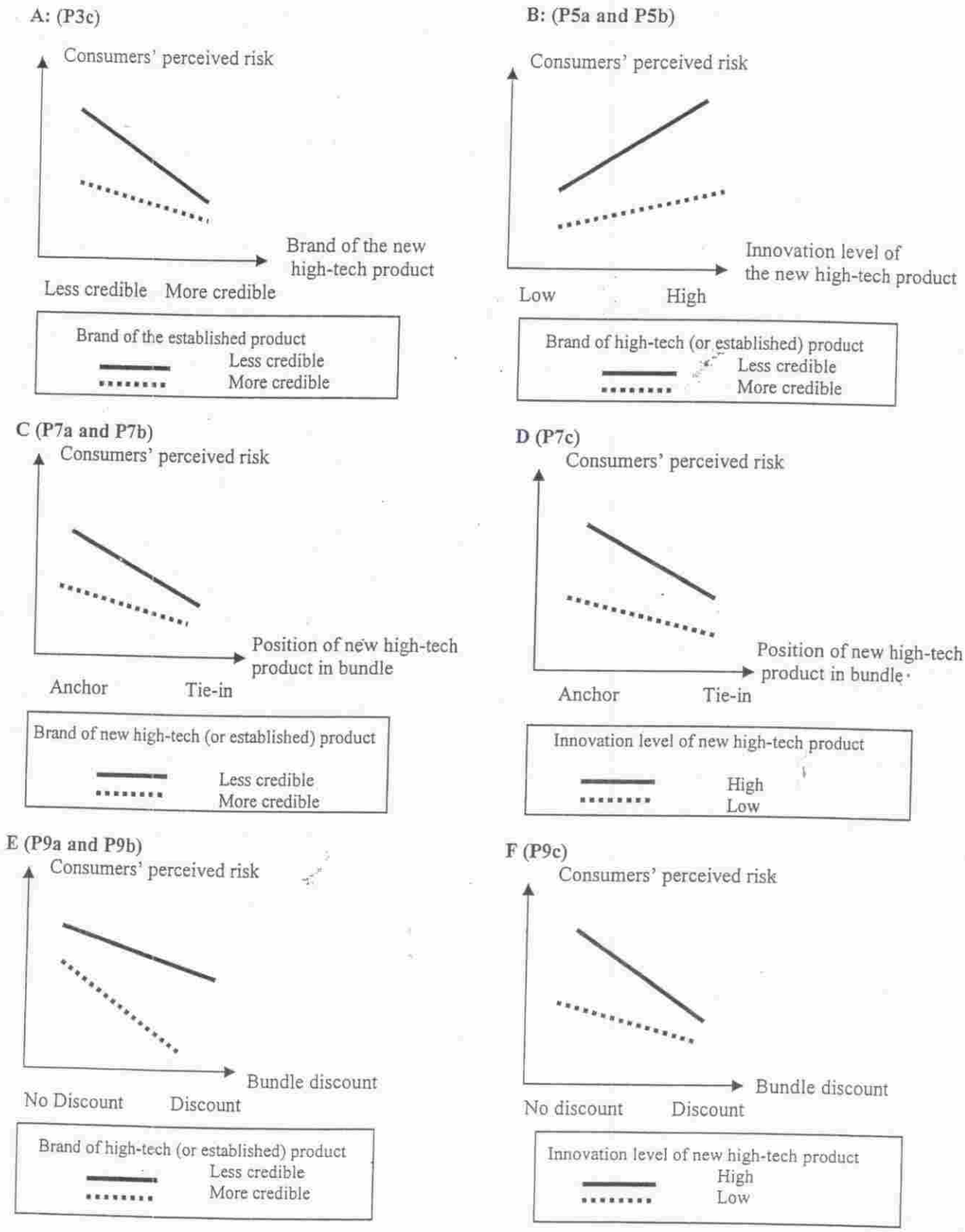
High-tech markets are characterized by high levels of uncertainty related to product standards, product compatibility, availability of complementary products, and vendor credibility/reliability. Such uncertainties stimulate anxiety felt by consumers, which can manifest itself in hesitation to purchase, deferment of purchases, and in extreme cases, exiting the market altogether (Dhebar 1996). Recent research suggests that for products and technologies that exhibit network effects, have competing standards, or require heavy investments in complementary infrastructure, the initial market adoption rate tends to be slower (Van den Bulte 2002). In such cases, consumers tend to defer purchases until enough other people have adopted, or until the standards issue has been resolved and it has become clear which technology will survive. Reducing the perception of risk, and hence the barrier to adoption, becomes an issue of critical importance for the introduction and commercialization of new technologies.

Many new technological products are subject to increasing-returns effects. The success of such products is not only highly sensitive to the size of their user bases, but also to the rate at which these user bases gain critical mass. In other words, the speed of market penetration becomes crucial. A marketers' ability to rapidly jump-start his/her user base becomes critical to the survival and success of many new technologies. While rapid diffusion and fast market penetration has always been of interest to marketers, they take on added strategic importance in high-tech markets because of effects on setting industry standards and long-term barriers to competitive entry (Van den Bulte 2002).

We propose bundling as a risk-reduction strategy that can benefit both marketers and consumers in high-tech markets. Marketers can use bundling as a strategy to commercialize new products and gain faster market penetration. Moreover, by bundling new technologies with existing and/or complementary products, marketers can reduce perceived risk by sending subtle signals to the consumers about the compatibility of the new technology, and the availability of complementary products.

Despite of the broader implications of bundling, previous research has examined bundling primarily as a promotional vehicle that marketers use to sell two or more products together at a discounted price. Although Stremersch and Tellis (2002) have called for more work on product bundles in the high-tech environments, research on this topic remains scarce. This is among the first studies to examine bundling and perceived risk in the context of new high-tech products.

FIGURE 1
ILLUSTRATIONS OF POTENTIAL RELATIONSHIPS



A conceptual framework designed to reduce consumers' perceived risk is developed and presented. This framework examines several combinations of factors found in marketing literature, such as brand credibility, level of innovation, bundle position (anchor vs. tie-in), and bundle discount. We not only propose that bundling a new high-tech product with an established product helps the consumer make risk-return trade-offs and results in a lower perceived risk, and hence a higher rate of new product adoption, we also provide specific recommendations for the design of such product bundles.

Although we argue that marketing new high-tech products in bundles is always likely to lower consumers' perceived risk compared to offering the same product in a stand-alone form, some types of bundles are likely to be more attractive than others. For example, bundles where a new high-tech product is presented with another established product, bundles where a new product is presented as a tie-in rather than an anchor, bundles with a credible brand name rather than a less credible brand name, bundles with incremental rather than radical innovations, and bundles with high discounts rather than low discounts are more likely to lower consumers' perceived risk than other bundles.

In addition to these main effects, we propose interaction effects to illustrate the trade-offs among different attributes of a bundle. In this study, we discuss possible brand-brand, brand-innovation, brand-position, brand-discount, and discount-innovation interactions. For example, when a discount is offered with other extrinsic cues such as a credible brand and a level of innovation, we argue that consumers are less likely to rely on price information. Consumers' perceived risk will be lower when a new high-tech product with a credible brand name is bundled with an established product with a credible brand name, when the new product has low level of innovation, and when the bundle is discounted. The study of interaction effects helps us identify the optimum combination of these attributes, and help us design the most effective bundles for a given context.

Marketers can use the information provided in this study to develop strategies for launching new high-tech products. This article provides guidelines for high-tech managers for designing optimal bundles that will help reduce consumers' perceived risk, while operating within the constraints faced by the managers (e.g., a less credible brand name).

Bundling strategies have implications for entrepreneurship in high-tech industries as well. New and small firms suffer from a mortality rate significantly higher than average. This phenomenon is referred to as the liability of newness and the liability of smallness (Singh, Tucker and House 1986; Wholey and Brittian 1986). These liabilities result from the novelty and ignorance associated with new and small ventures, especially relating to markets and technology (Shepherd, Douglas, and Shanley 2000). Under such circumstances, risk reduction strategies (Shepherd, Douglas, and Shanley 2000), and forms of external legitimacy can significantly depress mortality rates of new and small ventures (Singh, Tucker and House 1986). By bundling their new technology with established brands and products, new and small firms can gain external legitimacy by sending signals to the market about their credibility and reliability.

Limitations And Future Research Directions

This study has limitations that could be overcome in future extensions of this research. Future research could empirically test the propositions developed in this manuscript. Using a multi-factorial experimental design, consumers could be presented with different bundling scenarios constructed using options outlined in this study. Consumer could then be asked to rate these scenarios based on their risk perception and intention to buy the bundle presented to them under each scenario. Conjoint analysis could be used to deconstruct these ratings and determine how much risk is associated with the new high-tech product under each scenario. The propositions developed in this study could then be tested by comparing the risk associated with the new high-tech product under each scenario to a predetermined reference point. The above experiment could be repeated using different bundling contexts to test the reliability of the results.

In this article, we examine only five factors influencing consumers' perceived risk associated with a purchase of a product bundle. Future research may include additional factors such as consumer innovativeness and risk aversiveness. Innovators might react to a bundling strategy differently than other consumers would. Since many product categories from software to communication services are considered high-tech, future research might address how bundling strategies affect consumer decisions in different product categories. Future research might also explore marketing tactics that might be used to influence consumer perceptions of bundle positioning (i.e., which product is treated as anchor or tie-in; see Wansink, Kent and Hoch 1998). Finally, we hope this study will stimulate further research in the areas of bundling, risk reduction and new product introductions in high-tech markets.

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