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Risk**

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Bundling—New Products, New Markets, Low Risk

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IT HAS LONG BEEN a marketing axiom that customers buy bundles of satisfaction, not products. It follows, then, that they'll respond to certain combinations of products and services—air conditioners with free installation, combinations of software packages, or season tickets with parking privileges. The difficulty is in devising the bundles that both appeal to consumers and give cost or demand enhancing benefits to the producer. Eppen, Hanson, and Martin argue that the best approach is to treat bundles not as marketing gimmicks but as new products. They offer seven guidelines for creating competitive bundles and a framework for implementing them.

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AN INCREASING NUMBER of companies are realizing the value of combining separate elements of their product lines into bundles. Creating a bundle is like creating a new product. Thus bundles, like new products, can be instruments for implementing company strategy. Although bundles act like new products in the marketplace, they are typically much less expensive and risky to create. Also, given the important market advantage of reduced product introduction time, bundling has an added appeal. This article is devoted to the strategic use of bundles and bundle pricing.

A bundle is a group of products or services offered as a package. Bundles can have a wide variety of features. Some bundles include some items that are not available separately. Other bundles are offered at a price less than the sum of the individual item prices. Still other bundles endow the buyer with entitlements such as priority seat selection. In the case of a pure bundle, all items *must* be purchased as a complete package; they are unavailable any other way. As consumers we see the marketing aspect of bundling, but decisions about bundles aren't (or at least shouldn't be) the

sole province of the marketing department. Bundling decisions typically have serious cost and strategic considerations and thus deserve the attention of general management. Consider the following example:

In 1983, the Dodge Omni and Plymouth Horizon were endangered products.¹ With the base car priced at \$7,000 and all options priced separately (itemized pricing), these two variations on the same car could not compete with less expensive imports. At the time, the cars were available with a wide variety of options. Indeed, more than eight million combinations were possible. To become competitive, Chrysler switched to bundling and offered only forty-two combinations. The results were rather remarkable, as shown in Figure 1. Chrysler was able to reduce the price of the car, including a typical option package, by more than \$1,000. The lower prices attracted new market segments and extended the profitable product life by several years. The price reductions were made possible by reduced manufacturing costs: longer production runs lowered setup costs; reduced interactions resulted in better quality; and reduced carrying and shipping costs alone accounted for a \$2 million per year savings. Note that Chrysler presented the consumer with a new menu of choices at new prices; it introduced new products.

The general concept introduced by this example is that bundling is like creating a new product. Bundling, however, has two important advantages

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over the typical "start from scratch" new product. First, bundling avoids the large expenses and high risk of failure associated with the research and development phase of new products. Second, bundling begins with good information on customer preferences and production costs. New products do not. Managing bundles as new products rather than as marketing gimmicks has two broad implications: (1) bundles have a wide variety of potential uses, and (2) implementing a bundling strategy requires a serious commitment to an analytical decision-making process. We address both issues below.

We begin with a process for spotting profitable bundling opportunities. Bundling can be profitable when it lowers costs, expands demand, or enhances the performance of the products. The guidelines below can be valuable whether a firm is concentrating on low cost or differentiation as its basic strategic position.

Use Bundles to Reduce Costs

The impact of design on product or service cost has received special attention in the last ten years. Appropriate bundling can make several unique contributions in this regard. Bundling can help the firm lower production costs, and it can take advantage of differences in the costs of the bundled items.

Production Efficiency Bundling

Increased production efficiency played a large part in the Dodge Omni-Plymouth Horizon turnaround. There is a real danger in omitting production issues from the bundling strategy. For example, Table 1 shows the historical sales data for options with mid-sized automobiles. An automobile manufacturer used this data in its first pass at implementing a more aggressive bundling strategy. Its option package A included those items with a purchase rate of over 90 percent, that is, over 90 percent of the purchasers of this model had chosen the first two options. Option package B included all items with a purchase rate of over 80 percent, and option package C included all items.²

The problem with this approach is its lack of concern for production efficiencies. Note that the first three items must all be assembled into the steering column. Steering column assembly is a difficult operation, and bundles A and B require different assembly procedures. Since cars are not grouped on the assembly line according to option packages, line workers had to change the assembly procedure every time a car with bundle A appeared. An analysis of production costs found that it would have been cheaper by over a million dollars to simply give intermittent wipers away with bundle A than to use the selected procedure. All setup costs associated with the different steering columns could have been eliminated.

Guideline 1: Promote bundling among components that have high setup costs.

Margin Spread Bundling

A struggling software vendor had two distinct types of items in its product line.³ Internally developed products yielded an 80 percent contribution margin, whereas those developed by third parties

Figure 1 Dodge Omni-Plymouth Horizon Sales

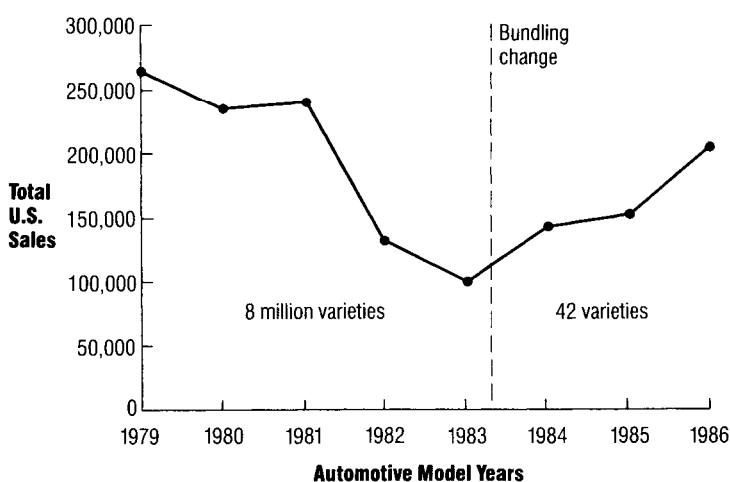


Table 1 Car Option Bundling Data

Option	Historical Purchase Rates for Options	Option Bundles		
		A	B	C
Tilt steering	95%	✓	✓	✓
Cruise control	92	✓	✓	✓
Intermittent wipers	87		✓	✓
Radio	83		✓	✓
Power locks	80		✓	✓
Floor mats	71			✓
Power windows	60			✓
Special wheels	59			✓

Data partly disguised for confidentiality.

had a 35 percent margin. The vendor's bundling scheme was a traditional all-units discount; a purchase of over \$1,000 received a 15 percent discount, and a purchase of over \$1,500 received a 20 percent discount. This is unlikely to be a good pricing scheme. With a 15 percent discount, internally produced items would only need a 23 percent increase in demand to raise profits. Externally produced items would require a 75 percent increase in demand. Unless there is a great difference in price elasticities, it would be better to offer different discounts on different products. This is easily done by bundling internally produced components and offering third party components separately. We will take up this example again in more detail in the implementation section.

Guideline 2: Bundle items that have a high contribution margin ratio.

Use Bundles to Expand Your Market

Bundles can effectively increase demand. To utilize the available strategies, you must understand how the various segments of your (potential) customer population value the different elements of your product line. In this section we discuss three market-expanding strategies: aggregation bundling, trade-up bundling, and loyalty bundling.

Aggregation Bundling

This concept involves producing a bundle that will appeal to a number of customer segments. Suppose you have four items: A, B, C, and D. One segment strongly prefers the first three, and a second segment strongly prefers the last three. It may be possible to combine all four items into one bundle and price it so that both segments will purchase it, albeit for different reasons. That is, by bundling, you are combining segments of the market with different tastes and preferences into an aggregate segment with a similar valuation for the bundle. The goal is to attract a large market and reduce complexity by having fewer products. The secret is in pricing the bundle so that your comprehensive offering is more attractive than specialized bundles offered by competitors. A corollary of the basic strategy is to produce, in addition, special bundles (or individual items) for smaller market segments at higher prices.

Credit card firms use this strategy. The typical

credit card includes a wide variety of services. It is unlikely that a large segment of subscribers actually are interested in all of these services. Customers who travel frequently may value car rental insurance or access to traveler's checks in foreign countries. Others may value a purchase protection plan. They all buy the same card.

This apparently has been a winning strategy for credit card companies. American Express introduced it in 1966 for the gold card, and Visa and MasterCard followed closely. American Express continues to aggregate differing customer segments by wooing college students and increasing the number and types of locations that accept its cards. Currently places like Shoney's family restaurants and Cineplex movie theaters accept American Express.⁴ How this expansion will affect its standing in the prestige segment of the market remains to be seen. In an effort to cater to this segment, American Express offers the platinum card for \$300 per year.

Restaurants are also heavy users of aggregation bundling. Standard dinner packages include soup, salad, and entrée. Restaurateurs hope that most of their clientele will order the dinner package. However, to satisfy both large and small appetites, the à la carte menu offers individual items at premium prices. This mixed approach to bundling is especially valuable for restaurants. Because of the social nature of their service, the same menu must accommodate all members of a party.

The rapid changes in the health maintenance organization (HMO) industry show that customer pressures can frustrate attempts to maintain a single aggregate market bundle, and that companies sometimes can unbundle. Historically, HMOs have been a prime example of a pure bundle; all of an individual's health care needs are met at one fixed price. But customers are demanding alternate bundles. Employers feel they must offer something for all of their employees. Non-local sales staff, long distance commuters, and employees with unusual medical needs are hard pressed to use the standard HMO plan. Preferred provider organizations (PPOs) have little difficulty in handling these individual needs. Thus, to meet the PPO competition and to retain employer contracts, HMOs must customize reduced or altered health care plans. These are usually priced at a substantial premium.

Guideline 3: Target the bundle for an aggregate mar-

ket and offer higher priced individual items to unusual customer segments.

Trade-Up Bundling

This strategy involves creating a product line that consists of a number of graduated bundles. Starting with the basic item, each new bundle includes more items at a higher price and some inducement to persuade consumers to “trade up” to the next bundle. Determining the spacing between bundles and the magnitude of the inducement is crucial to the strategy’s success. In general, strong demand favors fewer offerings and more of a pure bundling approach. Weak demand favors more alternatives with smaller gaps between bundles, so as to encourage trading up. Trade-up bundling is especially valuable if purchases are not price driven and thus respond to other inducements. Professional baseball teams have learned this lesson well. Consider the two Chicago teams, the Cubs and the White Sox. During 1989 the White Sox offered ten different bundle plans. These included such combinations as the twenty-eight game “Luke Appling” Plan and the fifteen game “Luis Aparicio” Plan, in addition to single game tickets, season tickets, and a variety of patio and picnic area plans. The Cubs, on the other hand, only offered three plans. What accounts for this bundling variation?

A statistical analysis of the number of plans offered by all major league clubs provides a compelling answer. The most important explanatory variable for the number of plans offered, which is highly significant, is the previous year’s stadium capacity utilization. The higher the capacity utilization in the previous year, the fewer plans offered. The most in-demand franchises offer only two plans—single tickets and season passes. Weak franchises must offer many more plans in order to get any amount of trading up by baseball fans.

It is also interesting to note the lack of price discounting in the various baseball packets. The price of most bundles is simply the number of games times the single ticket price for a game. Baseball executives apparently agree with Demmert and Noll that the demand for baseball is relatively price inelastic.⁵ However, even without price breaks, there are advantages to buying the bundles. Seats are allocated in order of bundle size. Bundles also offer preferential parking, fan memorabilia, and post-season ticket guarantees.

Guideline 4: In a price insensitive market, create comprehensive bundles when demand is strong and multiple smaller bundles when demand is weak.

Loyalty Bundling

Here the basic idea is to expand sales by reducing customer incentives to sample and perhaps switch to a competitor’s product. CitiCorp has used its CitiOne financial account successfully to this effect. Customers who purchase this account receive a reduced price on a bundle of services. For example, a minimum balance in a money market account gives the customer check writing privileges at no charge. CitiCorp also wins. First, it gains operating efficiencies. It costs about the same amount to open one or several accounts for a customer at the same time. A bundled account opens several accounts simultaneously. Second, Citicorp’s research shows that customers who purchase two or more products from the same institution are unusually loyal. Once the accounts are open, the transaction cost to the customer is very low. A person is more apt to move funds from the checking account to the money market fund during a cash transaction than to initiate a new transaction with a competing bank. Thus for no increase in its operating cost, CitiCorp obtains a sales advantage.

Consumer goods firms also package products in order to build manufacturer loyalty, or at least to encourage switching only among their own offerings. Cereal manufacturers offer different “variety packs” geared to adults and children. Each pack has between six and twelve different brands of cereals. Firms satisfy consumer desire for variety while retaining their customers under the broad umbrella of one manufacturer.

Guideline 5: Use bundling to raise consumer switching costs and reduce consumer trial.

Use Bundles to Improve Product Performance

Most companies produce related products and services. Indeed, considerable effort is typically devoted to make sure that individual items in a product line work well together. Bundling can reinforce this and encourage consumers to buy the proper combinations of services and products. This can enhance customer satisfaction and pre-

vent disappointment with poorly coordinated services.

Joint Performance Bundling

Bundling can prove successful if purchasing all elements in a package is important to consumer satisfaction. But sometimes consumers only learn or believe this after the fact. Such was the experience of the Kindergarten Mathematics Project (KMP) at the University of Chicago. This organization sells books, specialty calculators, audio visuals, and teachers' manuals to supplement grade school mathematics curricula. In field testing it offered the items as separately priced components. A number of school districts would not order the entire package, despite warnings against the practice. In particular, the administrators often would not order the special teacher audio visuals and the special calculator, which was coordinated with the textual material. KMP discovered that in many cases the self-constructed bundles did not perform well. The result was dissatisfied customers. In order to protect its own reputation and to promote the validity of its educational approach, KMP soon began to offer only the complete package of materials. Student performance responded accordingly.

Bundling also enhances product performance when the firm has better information and expertise than its competitors. Otis Elevator is the largest provider of elevators in the world. One feature of its successful approach is a very aggressive promotion of service and maintenance contracts at the time of elevator installation—the purchase and service contracts are sold as a bundle. Elevator owners incur a substantial pricing penalty if they buy service contracts after their elevator has been in operation.

By ensuring that most elevator customers buy the service plan, Otis obtains economies of scale that enable it to provide highly knowledgeable service teams twenty-four hours a day. It can also outfit elevators with the most advanced malfunction detection equipment. The bundling of purchase and service contracts directly influences the product's performance. And revenues from service contracts account for over 60 percent of total Otis sales and an even larger fraction of Otis' profits.

Guideline 6: Use pure bundling when components perform better together than separately.

Product Definition Bundling

We have argued that creating a bundle is like creating a new product. In some cases the bundle is a new product. When an organization prepares to introduce a new product or service it may have the opportunity to bundle the basic unit with other components. Indeed, the bundle may well serve to define the product, if only for a short time. This is common with products that rely on a new technology. The company believes that, since potential customers do not have experience with the product, they will benefit from reduced selection. Once they become familiar with the components, the company will unbundle. Thus, bundling is often a transitional but important strategy to launch new technologies.

The Osborne Computer Company used product definition bundling to great advantage. Starting in 1981, it grew rapidly enough to set landmarks for the quickest rise to \$100 million in sales for a startup company. Much of its success was credited to a unique bundling of adequate hardware and the leading software. The success was short lived. As consumers gained experience with personal computing, they were able to purchase hardware and software combinations to meet their own needs, and firms with superior hardware soon replaced Osborne as industry leaders.

Caution is required when using product definition bundling, even as a transitional approach. At best, it is "selling a solution." At worst, it is imposing the firm's preferences on the users. While this can be a risk for many of the bundling approaches, it is especially severe for new technologies. The Macintosh computer defined many innovative approaches to personal computing when it was introduced as a heavily bundled, "closed" system. However, the difficulty of adding an effective hard disk storage device severely hampered early sales to businesses. Redesign and technical improvements eventually removed this difficulty. Product definition bundling must carefully balance the advantages of a single well-defined system against its limitations in flexibility.

Guideline 7: For new product categories, consider

bundling that helps consumers understand the full range of product and service benefits.

Implementing Bundling

Proper bundling requires management to consider a number of factors simultaneously. This is not an easy task, and we have seen managers make serious mistakes because they left one of these factors out of the analysis. Clearly, managers must understand the product line and the market opportunities. But three aspects of bundle design and pricing limit management's ability to completely analyze a bundling opportunity:

- the large number of possible bundles;
- the need to carefully track consumer choices among all of these possible bundles; and
- the extreme importance of sensitivity to competitive reactions.

We present a decision analysis aid designed to meet this challenge. Let us revisit the bundling decision facing the software company we discussed earlier. Our process has three main stages. First, we must *frame the problem*. This requires us to identify the potential bundles we might sell. Second, we must *gather data*. This data is used to define and identify customer segments, to estimate the value each segment places on each bundle, and to estimate the cost of providing each bundle. Third, we must *analyze the results*. In this step we select the appropriate prices, estimate how consumers will react to these prices, and evaluate the quality of the prospective pricing policy.

Framing the Problem

Effective bundling requires insight, data, and judgment. To understand and simplify the problem, managers must depend on their insight. Our firm has five software modules: basic statistics, advanced statistics, graphics, data entry, and database manipulation. All packages are sold with the basic statistics module; the others can be mixed and matched. This presents us with the possibility of individually pricing sixteen different product combinations. If

basic statistics = S, advanced statistics = A, graphics = G, data entry = D, and database manipulation = B, then the combinations are S, SA, SG, SD, SB, SAG, SAD, SAB, SGD, SGB, SDB, SAGD, SAGB, SADB, SGDB and SAGDB. This is both too complicated and unnecessary.

Intuitively, we can guess that a better approach would be to mimic the current pricing, with a twist. We will want a single unit price, one or two core bundles, and possibly a discount for modules bought in combination with the core bundles.

Of key concern to the firm are the costs of providing the software packages. The incremental cost of providing each module can be determined by the formula *incremental cost = royalty payment + packaging + support*. Table 2 shows the internal and external costs. For the internal packages, support is cheaper because the firm better understands the routines and has more control over the features and options.⁶

As described earlier, this firm gives a 15 percent discount on purchases over \$1,000. Under the current pricing policy of \$395 per package, three module combinations receive the 15 percent discount. Table 3 reveals a problem caused by the current pricing scheme. Very different types of sales are being treated as if they were the same.

Our data gathering and analysis will help us judge the proper components in our bundles, and how extensively they should be promoted. In the meantime, our intuition, using Guideline 2, points to combining the internal modules as the core bundles.

Gathering Data

The next step is to capture customer valuations for the possible software products in a simple and useful way. In particular, we use a *reservation price* to represent a customer's preference for a software product. The reservation price is defined as the most that the individual would pay for the item.⁷

This approach has a strong appeal; it allows off-the-shelf, well-established market research techniques to provide the data. Our normal approach is to use conjoint analysis, familiar to literally thousands of firms as a standard quantitative procedure. The conjoint method begins with a sample of current or possible customers. Each customer is presented with a carefully structured survey that contains a series of conceptual choices they must make (note that they do not actually purchase

Table 2 Software Module Costs

	Royalty	Packing	Support
Internal	\$ 0	\$35	\$30
External	\$175	\$35	\$55

anything). They choose between paired descriptions of current or potential product offerings that include the price they would have to pay for each bundle. For each comparison, the respondent simply picks the most desirable bundle.

Once the survey has been administered to the entire sample, the manager identifies the important customer segments and their valuations of the different possible bundles. Hausman and Montgomery provide an excellent guide to this procedure.⁸ First, the manager identifies key segments that are known to be important. The statistical procedure then calculates the best matching of survey respondents to these segments—complete with the calculated reservation price for each bundle. Second, the statistical procedure investigates whether unanticipated additional customer segments are present in the data. This produces a customer segment profile, the valuations of each of these segments for the possible bundles, and measures of the errors in these numbers.

Table 4 presents a reduced and simplified version of what this procedure yields, based on our a priori segments. Each row of the table corresponds to the valuation of a specific consumer segment. Each column of the table is the valuation placed on a particular item or bundle by the different segments. The final column of the table is the relative market size of each of the segments.

One of the principle items of interest at this stage is the identification of bundles that do not simply sum to the valuation of the individual items. If the valuation of the bundle is more than the sum of the individual items, then that consumer segment views the bundle as performance enhancing. If the sum is less, then that consumer segment views portions of the bundle as overlapping and wasteful. For most products there will be examples of both of these phenomena. For exposition only, we will limit the example to the case where the valuation of each bundle equals the sum of the valuations of the individual components. Even ignoring performance enhancement, bundling can be a valuable tool for raising profits.

Analyzing the Results

The profit impact of a switch from the old pricing strategy to a bundling approach is dramatic for this example. Table 5 compares the results of the two approaches.⁹ Recall that the old plan offered the items at \$395 per module, with a 15 percent

discount for purchases over \$1,000 list and 20 percent off for purchases over \$1,500 list. Under the bundling approach we still leave the individual component price at \$395 per module. In addition, we offer two specially priced bundles. Consumers pay \$745 for bundle SA, the basic and advanced statistics modules. An even better deal is offered on bundle SAD, the previous bundle plus the data entry module. This is priced at \$800. Additional modules purchased with these bundles are priced at \$320. Observe that while Guideline 2 would have suggested three core bundles of internal modules (SA, SD, SAD), the model results show that only the two bundles SA and SAD are necessary to achieve the bundling benefits.

Using the bundling approach, profits increase by over 45 percent. Three factors contribute to this rise. First, more segments buy the software. In the old pricing scheme, academic users were priced out of the market. Under the new pricing scheme, this segment purchases the bundle of the three internally produced modules at \$800 (previously priced at \$1,007 with the discount). Second, the bundle pricing approach steers purchases much more effectively toward the internally produced modules. Under the old pricing scheme, all four segments that purchased the software bought some externally produced modules. Under the

Table 3 Effect of Margin Spread on Profit Contribution

	Three Internal Modules	Two Internal, One External	One Internal, Two External
List price	1185	1185	1185
After discount	1007	1007	1007
Incremental cost	195	395	595
Profit contribution	812	612	412
Contribution margin ratio	81%	61%	41%

The contribution margin ratio (CMR) = (revenue - incremental cost)/revenue. A large CMR indicates that increases in unit sales will primarily raise profits. It supports offering discounts to get additional sales. A low CMR cautions against discounts and promotions.

Table 4 Consumer Segments and Preferences

Segment	Software Module					Segment Size
	Basic Statistics	Advanced Statistics	Graphics	Data Entry	Data-Base	
Market research	400	450	350	125	225	30%
Brand manager	350	200	375	75	295	18
Market expert	350	400	275	50	200	10
Data clerk	375	100	300	350	220	17
Academic	200	500	200	100	175	25
Product source	Internal	Internal	External	Internal	External	

Table 5 Bundling versus List Price Discounts

Segment	Old Pricing Scheme		Bundle Pricing		Profit Increase per Customer
	Items Bought	Price Paid	Items Bought	Price Paid	
Market research	SAG	\$1007	SAGD	\$1120	\$ 48
Brand manager	SGB	\$1007	SAGB	\$1220	\$148
Market expert	SAG	\$1007	SA	\$ 745	\$ 3
Data clerk	SGD	\$1007	SAD	\$ 800	\$193
Academic	Nothing		SAD	\$ 800	\$605

S = Basic statistics
A = Advanced statistics
G = Graphics
D = Data entry
B = Database

bundling approach, only two of the five purchasing segments include the high cost external modules. Third, consumers increase the number of modules they buy. Under the bundling scheme three segments increase the number of modules they buy, and only one segment reduces its purchase. However, in this reduction it drops the high cost external module.

By achieving this three-prong increase in the quality and extent of purchases, bundling has dramatically increased profits in this example. Although not all improvements will be this large, these benefits were achieved with very little change in the manner of doing business. In addition, they have been achieved with a *decline* in average prices.

Summary

This article has stressed four points: (1) bundles should be thought of as new products; (2) bundles have real potential for implementing corporate strategy; (3) creating effective bundles is a task for general management, not just marketing; and (4) a decision methodology is available to help managers make effective bundling decisions. This methodology relies on data that is a common part of most marketing analysis and helps make the quantitative tradeoffs that the qualitative bundling guides identify.

Even in market situations that are highly competitive, profitable opportunities may already exist within a company's product line. The essential management step is to think of product bundles as a method for improving performance, lowering costs, and reaching out to new customer segments. ■

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R. Kipp Martin's work was supported by the FMC Faculty Research Fund at the Graduate School of Business, the University of Chicago.

1 D. Sease, "Getting Smart: How U.S. Companies Devise Ways to Meet Challenge from Japan," *Wall Street Journal*, 16 September 1986, pp. 1, 24.

2 This example and data were provided by a major automobile company as part of a joint effort on bundling problems.

3 These data were provided by a software vendor in connection with a consulting engagement.

4 *Business Week*, 9 October 1989, pp. 134-138.

5 See H.G. Demmert, *The Economics of Professional Team Sports* (Lexington, Massachusetts: D.C. Heath, 1973); and R. Noll, *Government and Sports Business* (Washington, D.C.: Brookings Institution, 1974).

6 Confidentiality requires some disguise of the particulars of costs and consumer segments.

7 The actual purchase decision is determined by the *consumer surplus*, the difference between the reservation and the market price. Consumers choose products that enhance their consumer surplus. In high involvement purchases, especially those using professional decision makers, we expect the consumer to choose the bundle with the maximum consumer surplus. For lower priced consumer products, it is often best to make the choice somewhat random, with a larger chance of being chosen for a product yielding large consumer surplus.

8 For information on the conjoint methods most appropriate to a bundling analysis, see:

P. Green and W. Desarbo, "Componential Segmentation in the Analysis of Consumer Tradeoffs," *Journal of Marketing* 43 (1979): 83-91;

S. Goldberg et al., "Conjoint Analysis of Price Premiums for Hotel Amenities," *Journal of Business* 57 (1984): 111-132; and W. Hausman and D. Montgomery, "Making Manufacturing Market Driven" (Stanford, California: Stanford University Graduate School of Business, Research Paper No. 1103, October 1990).

9 These prices and consumer decisions were obtained using the modeling software in:

W.A. Hanson and R.K. Martin, "Optimal Bundle Pricing," *Management Science* 36 (1990): 155-174. In addition to calculating the best prices and possible bundles, this methodology allows for a variety of sensitivity analyses, such as responses by competitors.



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