Journal of Retailing and Consumer Services 21 (2014) 48–53

Contents lists available at ScienceDirect

Journal of Retailing and Consumer Services

journal homepage: www.elsevier.com/locate/jretconser

Bundling products to success: The influence of complementarity and advertising

Ruiliang Yan [a,*], Chris Myers [a,1], John Wang [b,2], Sanjoy Ghose [c,3]

[a] Department of Marketing & Management, College of Business & Entrepreneurship, Texas A&M University, Commerce, TX 75428, USA
[b] School of Business, Montclair State University, Montclair, NJ 07043, USA
[c] Lubar School of Business, University of Wisconsin, Milwaukee, WI 53201, USA

ARTICLE INFO

Article history:
Received 17 April 2013
Received in revised form
25 June 2013
Accepted 23 July 2013
Available online 17 August 2013

Keywords:
Bundling
Advertising
Product complementarity
Marketing strategy

ABSTRACT

This study investigates the strategic influence of product complementarity and advertising on the success of bundling products. We use a profit maximization model to show that when a firm sells bundled products, both the product complementarity and advertising significantly impact the performance of bundled products. The bundling strategy with advertising can help firm achieve higher performance than the bundling strategy without advertising. However, the price discount to the identical products must be attractive to customers and the degree of product complementarity to the complementary products must be large enough, and then the bundling strategy with advertising can obtain a success in the market. Furthermore, our results also show that when the degree of the complementarity between two products increases, firm should invest less on advertising to promote the bundled products. Based on our results, we propose optimal marketing strategies for firms to adopt. Firm managers can utilize our findings to plan their bundling strategies wisely.

1. Introduction

Bundling sales are becoming more and more popular in the business market, though the pricing and advertising of these bundles remains an extremely challenging task. Firms need to consider various issues, including segmented customer demand, product-specific costs, and consumers' multiple options. Furthermore, bundling decisions have significant implications for business managers and important influence on firm's marketing strategies as nowadays integrated and unique solutions become more common for firms' central market offering (Stremersch and Tellis, 2002; Venkatesh and Kamakura, 2003). Finally, bundling can also minimize consumer costs, depending on the number of items bundled, the value of those items, and the level of the variations (Estelami, 1999; Arora, 2008).

Because product bundling can offer economies of scale, bundle choices and sizes are significant for both consumers and sellers. Various product bundling strategies have been employed by different firms (Stremersch and Tellis, 2002; Arora, 2008). For example, many actual examples about complementary product bundling exist in the market, such as the bundle of DVD players and disks in BestBuy, the bundle of computer hardware and software in Staples, the bundle of Internet and Phone from Comcast, the bundle of fish pole and reel in Wal-Mart, etc. Furthermore, there are also a large number of examples about identical product bundles in the business market. For example, socks sales in Kohl's, car rent, auto tires, hotel booking, etc.

A related question is that once the decision to use the bundling strategy to sell products is made, what a firm needs to do to ensure that the bundling strategy is beneficial and successful. We show in our research that in order to maximize its profit, the firm needs to engage in an advertising campaign to promote the bundled products while ensuring the success of the bundling strategy (e.g., considering price discount, the degree of product complementarity, etc.) and making the bundling strategy perform more efficiently. The advertising can be defined, in our model, as seller-originated advertising that serves to inform the market of the existence and value of the bundled products. This advertising helps advertise the product quality characteristics, attractive price, discount, coupon and other promotions, in order to attract customers to buy.

Widespread actual examples have prompted various research models (Estelami, 1999; Stremersch and Tellis, 2002; Venkatesh and Kamakura, 2003; Arora, 2008), though none of prior models ever addresses bundling pricing policy and advertising strategy simultaneously for both identical and complementary products. We therefore propose a valuable model to address the optimal

* Corresponding author. Tel.: +1 903 886 5710; fax: +1 903 886 5702.
E-mail addresses: Ruiliang.Yan@tamuc.edu, ruiliangy@gmail.com (R. Yan), Chris.Myers@tamuc.edu (C. Myers), j.john.wang@gmail.com (J. Wang), sanjoy@uwm.edu (S. Ghose).
[1] Tel.: +1 903 886 5700; fax: +1 903 886 5702.
[2] Tel.: +1 973 655 7519.
[3] Tel.: +1 414 229 4224.

0969-6989/$ - see front matter © 2013 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.jretconser.2013.07.007

bundling price and advertising strategies for both identical and complementary products simultaneously. Furthermore, we also address the impact of the degree of complementarity between the two products on bundling pricing and advertising strategies. The degree of complementarity and the invested advertising should influence the advantages of bundling products and thus the optimum bundling that allows the firm to maximize its profit. Cournot (1938) and Stremersch and Tellis (2002) show if joint consumption is mandatory, firms should set an optimal price based on the value of the joint consumption. The firm's sales therefore depend on the price of the bundle, the degree of product complementary, and the effectiveness of the invested advertising.

Specifically, we utilize a profit maximization model to address the following main research questions: (1) What is the optimal bundling pricing for identical and complementary products, respectively? (2) What is the optimal advertising expenditure when firm invests advertising to promote the bundled products? (3) Is the bundling strategy with advertising always beneficial to firm? If not, under what conditions can firm benefit from such a strategy? (4) How does the invested advertising change as the degree of product complementarity changes? To answer these questions clearly, we consider and analyze three scenarios as follows.

Scenario 1: No bundling—firm sells two products separately.
Scenario 2: Bundling with advertising—firm sells the bundled products and invests advertising to promote the bundled products simultaneously.
Scenario 3: Bundling without advertising—firm sells the bundled products but does not invest advertising to promote the bundled products.

We then compare these scenarios and derive the optimal market strategies for the firm.

In the next section, we summarize relevant literature before we present our model with three different scenarios. The main results pertain to optimal policies and valuable comparisons are summarized in Section 3. The results of numerical examples are presented in Section 4. In Section 5, we end our paper with some conclusions and managerial implications.

2. Literature review

Many prior papers studied the product bundling from the different perspectives, such as price segmentation (Stigler, 1968), price discrimination (Adams and Yellen, 1976), product range restrictions (Eppen et al., 1991), reduced classification or processing costs (Kenney and Klein, 1983), and scope economies (Baumol et al., 1982). Furthermore, Guiltinan (1987) provides a normative framework that integrates most of these rationales, and McAfee et al. (1989) propose a model based on this framework that indicates mixed bundling is the optimal strategy. The reservation prices (i.e. willing to pay) for the various products or services are independently distributed across the population of the consumers, and thus, as Schmalensee (1984) observes, the mixed bundling strategy generally yields higher profits than either pure bundling or a pure component strategy. Hanson and Martin (1990) propose an optimization model for calculating optimal bundle prices by considering multiple components, variety of cost, and reservation price. Their model solves for a wide range of bundle pricing problems, including the assumption of the free disposal of unwanted components, profit maximization subject to consumer self-selection, and the provision of a sufficiently large range of products that customers may select from the bundle. Yadav and MonroeSource (1993) examine buyers' perceived savings in a bundle price and showed that the perceived savings from bundling purchase have a greater impact on buyers' perceptions of transaction value than the perceived savings from individual purchase. Venkatesh and Mahajan (1993) propose a probabilistic model that a seller can use to determine the optimal price of a bundle with pure components, pure bundling, and mixed bundling strategies. Their model estimates the maximum level of profits for each category and includes time and money as independent variables. Yadav (1994) investigates how buyers evaluate product bundles and show that buyers would like to evaluate the bundled products from the most important to less important and form an overall evaluation about these bundles. Estelami (1999) conduct an empirical study to examine the consumer savings in complementary product bundles and show that consumer savings in complementary bundles can range from 57% to -18%. However, the aforementioned papers all ignored the influence of the degree of product complementarity and the value of advertising on bundling.

Stremersch and Tellis (2002) study the strategic bundling of products and prices and suggest various optimal bundling strategies for firm managers to choose and adopt. Venkatesh and Kamakura (2003) suggest an analytical model for optimal bundling strategies and price patterns in a monopolistic environment that demonstrates the optimal solutions for complements and substitutes. Their results show that consumers are willing to pay more for the bundle of complements than for standalone products. Arora (2008) conducts a factorial experimental design to study the effect of price bundling and message framing on consumer's attitude and intention for the complementary products. His results show that both the price bundling and framing message have a significant impact on attitudes, and their interaction effects have a significant impact on both attitudes and intentions. Wappling et al. (2010) investigate the possible link between the business orientation and product bundling strategies and to the type of customer influence on product bundling. Their results show that reasons for product bundling in the automobile and travel sectors are both production (e.g., try to sell more cars) as well as customer oriented (e.g., offer benefits to customers), the influence of bundling strategies on consumer is strong in the travel industry but not in the automobile and banking industries, and customers in the travel and banking industries have direct influence in how bundles are designed while customers in the automobile industry seem to have limited influence in designing the bundles. However, these papers did not address the degree of complementarity of the products and the value of advertising utilized to promote the bundled products, while we do. Furthermore, Yan and Bandyopadhyay (2011) investigate the bundling of complementary products and show that firm can benefit from the complementary bundling conditionally. However, their paper did not address the bundling strategy for the identical products and their paper also did not address the strategic role advertising plays on the bundling of the complementary products, while we do.

To address the conceptual and practical need for a structured analysis of current knowledge about product bundling strategies, we propose a profit maximization model to derive optimal marketing strategies for a firm that plans to employ a bundling strategy. We investigate various scenarios and compare these scenarios to propose optimal strategies for firms. To our knowledge, our research is the first one to study bundling pricing policy and advertising strategy simultaneously for both identical and complementary products and derive the important and valuable marketing strategies for firms to employ in the extant literature. Furthermore, our paper also is the first one to study how the degree of product complementarity impacts the advertising expenditure in the product bundling literature.

3. Model framework

3.1. *Scenario 1: benchmark model—no bundling*

A single firm sells two products to consumers. We first introduce this benchmark model and the pricing decision when a firm sells