Management Science

Research Note: Customer Intimacy and Cross-Selling Strategy

M. Tolga Akçura, Kannan Srinivasan,

Please scroll down for article—it is on subsequent pages

Research Note: Customer Intimacy and Cross-Selling Strategy

M. Tolga Akçura
Krannert Graduate School of Management, Purdue University, West Lafayette, Indiana 47907-1310,
akcurat@mgmt.purdue.edu

Kannan Srinivasan
Tepper School of Business, Carnegie Mellon University, Pittsburgh, Pennsylvania 15213-3890,
kannans@andrew.cmu.edu

Better targeting opportunities and the increasing role of information-intensive environments have created new challenges for firms in obtaining customer information. Such information can help firms increase their profits through cross-selling opportunities. However, revealing personal preferences and contact information can raise the risks for customers when dealing with a firm. Consequently, some customers trade off the benefit and risks of revealing information. As the opportunity to obtain a higher level of information increases, customers incur a higher level of risk when dealing with a firm. This increases the firm's incentive to commit on a cross-selling level. By such a commitment, a firm can obtain customer intimacy and benefit from detailed customer information. As a result, profits increase while prices decrease. Thus, legal regulations that explicitly require firms to spell out the extent of cross-selling may actually improve the profits of the firm.

1. Introduction

Firms vie to capture and sustain customer attention. Communicating with individual customers is becoming increasingly affordable and accessible, largely because of rapid strides in information technology. There is ever-growing emphasis on developing a personal relationship with customers. Technology developments such as video on demand, digital video recorders, advanced telemetric applications in the automotive industry, biometrics, smart card, and e-commerce applications coupled with interactive decision systems enhance the capability for one-to-one communications. A critical factor for developing customer intimacy through such personalized communications is the ability of the firm to truly understand its customers' needs and preferences. When a firm succeeds in doing so, a firm can effectively cross-sell many products and services that closely match its customers' preferences. Consequently, the firm can lower the churn, increase the number of loyal customers, and obtain higher customer lifetime valuation.

Successful cross-selling requires customer intimacy and detailed information on customer demographics and preferences. Once such information is available, firms can better leverage the data and identify cross-selling opportunities (Ansari and Mela

2003, Kamakura et al. 2003). Obtaining customer information is an important prerequisite that also identifies the success of cross-selling.

Acquiring detailed data at the individual level evokes mixed reactions from customers. While customers recognize that provision of information enables firms to offer products that match with their needs, customers are concerned that firms may leverage the information in ways the customers do not desire. For example, most customers do not like companies to provide customer information to other companies without permission, causing unwanted offers to arrive (Harris Interactive Survey 2002). A sense of insecurity and vulnerability, compounded by the additional nuisance of receiving these targeted offers, may aggravate customers (Bauer and Greyser 1968, Aaker and Bruzzone 1985). The Direct Marketing Association points out that concerns about the use of personal information are primary barriers to catalog purchasers, and these concerns play a significantly higher role for catalog purchasers compared to noncatalog purchasers (*Statistical Fact Book* 2000). Further, the popularity of do-not-call registries emphasizes the significance of such consumer-side risks for direct marketers. There is evidence that a firm's information management practices influence the level of purchases (Milne and Boza 1999, *The Economist*

2000), customer purchase intentions (Garbarino and Johnson 1999, Phelps et al. 2000, Shim et al. 2001), and window-shopping intentions (Gefen 2002, Pan et al. 2002). On the other hand, the shared information can benefit customers by providing better value and lower prices. Still, firm profit may increase with additional cross-selling revenue from third parties.[1]

There are many examples in which firms collect information to better understand their customers and benefit from the resulting opportunities. Successful cross-sellers require the customers to reveal information before accessing the site or the content. For example, many online retail sites require that users enable cookies that allow the firms to collect customer information. Amazon.com takes no phone orders, and customers must use the Web only. As a result, the firm collects far more information on preference, navigation, and transaction information. *The New York Times* online requires customers to provide information such as gender, income, age, profession, preferences, reading habits, and e-mail. The company has many partners, including retailers and entertainment companies. Citibank invests a significant amount of money in its electronic banking technology, where it can better collect and use customer information to identify many products for cross-selling, including insurance, mortgage, credit, and investment services. Dell channels its customers to its online site. QVC customers must register using the website and must provide detailed information, including many preferences, to use its services. These companies profit from the cross-selling activities as well as from the ads and click-through payments they receive from other firms. Customers also benefit from lower prices.

In general, customers perceive a degree of risk in sharing information with a firm. We call this the firm information-risk coefficient or, for short, "information risk." This risk can change based on firm and customer characteristics. The firm characteristic is set by the management and may include the contractual agreements that determine the extent of cross-selling activity and the commitment toward a certain level of cross-selling. Customer characteristics also play a role in determining the information risk. Although many customers pragmatically compare risks and benefits when it comes to sharing information, the level of trade-off can vary. For example, in a recent survey with 112 undergraduate students, we find that 33% of the participants would stop buying from the firm, whereas 43% might demand further compensation and benefits as a result of a higher cross-selling activity.

We pose the following research questions: How do the perceived information risk and cross-selling influence a firm's ability to extract information? How does information exchange affect pricing strategy? Can a firm benefit by committing to a certain level of cross-selling?

We use a stylized model to analyze the firm-customer interaction in a monopoly setting. Customers are risk averse and can choose whether or not to reveal information. For brevity, the information is assumed to be a single-dimensional variable. A firm can perfectly discriminate the customers based on perceived information risk (e.g., opt-out policies and correspondences help a firm identify the information risk). The information, when shared with a third party, is used for cross-selling activities. Sharing information increases customer costs irrespective of the third-party cross-seller strategies. The firm obtains a cross-selling revenue that is proportional to the customer valuation (cross-sold products are complementary).

We find that firms can obtain a high level of customer information and achieve customer intimacy when committing against a certain level of cross-selling activity. In this case, customers are willing to share their information with the firm and benefit from lower prices. The high level of customer information that comes as a result of commitment generates superior cross-selling revenue. Price decreases and profit increases as committed firms obtain higher information. Cross-selling strategy distorts price levels. For example, customers who reveal more (valuable) information may pay a lower price. Some firms may obtain a higher amount of information as the number of customer clicks increases; Clemons et al. (2002) argue that there is a negative correlation between prices and the necessary number of clicks to complete the transactions. In addition, online retailers that use "lead generators" can charge lower prices (Ghose et al. 2002). Although prices decrease as a result of the increased cross-selling activity, customers limit the amount of shared information when they are not sure about the extent of cross-selling; a firm obtains a limited cross-selling revenue and lower profit without a commitment strategy. When firms can precommit to a certain level of cross-selling, they are strictly better off. In fact, the clamor for regulations that enforce commitment may *help* rather than *hinder* a firm's profit. Because regulations can act as credible commitment mechanisms, they could improve the welfare of the firms as well as that of the consumers. With a commitment strategy and by decreasing the amount of shared information, a firm can limit the impact of opportunistic behavior. As a result, customers reveal much more information, and the firm obtains a higher cross-selling profit.

---

[1] "Third parties" means other departments in a firm as well as other firms.

2. Model

A monopolist firm with a single product collects and shares customer information with a third-party cross-seller. The firm needs to decide on price and the cross-selling strategy in a unit size market. Customers are averse to providing information. The undesirable use of information and the resultant cross-selling activity could result in unsolicited intrusions and create a risk of sharing information, which we call information risk. Given a firm that shares α percentage of information with a cross-seller, $r(\alpha)$ represents the firm information-risk coefficient. If the firm does not engage in cross-selling, there is no cost to the customers, and $r(0) = 0$. Customers incur a higher cost as the firm increases the cross-selling activity; $r_\alpha(\alpha) > 0$, where the subscript α represents the derivative of the function with respect to α. Then, the cost of revealing information is captured by $r(\alpha)i^2$, where i represents the information the firm obtains from the customer, such as contact addresses, demographics, and preferences. A customer with valuation θ pays a maximum price of θ for the firm's product with no customer information. Customers have different valuations, and customer valuation is distributed in the interval $(\underline{\theta}, \bar{\theta})$. A firm can perfectly discriminate customers, and customers with different valuations may pay different prices. (When a firm cannot perfectly discriminate customers, a firm may provide incentive-compatible offers. With incentive-compatible offers, the main insights of the model hold. Interested readers may contact the authors for further information.) If a firm charges a price p for customer θ, the customer surplus is[2]

$$u_\theta(i, p) = \theta - r(\alpha)i^2 - p. \tag{1}$$

When providing service to a customer, a firm charges a price for the service and collects information that is valuable for a third party and the cross-selling activity. As customer valuation increases, the collected customer information becomes more valuable for a third party when the cross-sold offers are similar or complementary. For example, a customer who buys more or expensive toys for children may also buy more or expensive books and other educational materials for children compared to other customers. Hence, we assume that the unit contribution of the shared information increases in proportion to customer valuation. Then, a firm obtains a higher cross-selling revenue because of a combination of using a higher amount of information for cross-selling (αi) and obtaining a higher unit contribution for the cross-sold information (which is proportional

to the customer valuation θ). However, a firm can profit from the customer information as long as it obtains more than a basic level of information (customer's contact information). Let i_0 represent the minimum level of information to profit from cross-selling. Then, the cross-selling revenue is proportional to $\theta\alpha i$, where $i \geq i_0$. (If $i < i_0$, the firm obtains no cross-selling revenue from the customers.) When dealing with customer θ, the firm's problem is

$$\max_{\{i, p\}} \Pi = p + \theta\alpha i$$
$$\text{s.t. } u_\theta(i, p) \geq 0, \tag{2}$$

where i is in the interval $[i_0, \bar{i}]$ or equals 0,[3] and p is a real number, which can be positive or negative. Initially, we fix the level of cross-selling (α) and investigate the impact of information exchange on the firm strategy. (A firm may not be able to change its cross-selling strategy when it is set by the firm's strategic environment, including its technology, current alliances, and standing contracts with other trade partners.) Then, we consider the optimal cross-selling strategies.

The game is played in two stages. In Stage 1, a monopolist firm decides on the information and price strategy. In Stage 2, after reviewing the firm offers, customers decide whether or not to participate and accept the offers. We consider the subgame-perfect equilibrium, where the firm moves first, setting the information and price knowing the customer utility. Then, the customer moves and decides whether or not to take the offer. Next, we present the solution of the game.

3. Solution and Analysis

The optimal strategy of the firm maximizes the profit as given in Equation (2). If the optimal information level $i^* > i_0$, the firm profits from information. At the optimum, the interior solution calls for $i^* = \theta\alpha/(2r(\alpha))$. The firm charges a maximum price that ensures customer participation $p^* = \theta - \theta^2\alpha^2/(4r(\alpha))$ (see Equation (1)). However, if $i_0 > \theta\alpha/(2r(\alpha))$, a firm cannot cross-sell and profit from information without distorting its interior solution to a corner solution, where $i^* = i_0$. If the necessary distortion between the interior solution and the corner solution is small and $\theta\alpha/(r(\alpha)) > i_0 > \theta\alpha/(2r(\alpha))$, the firm prefers asking for the minimum information level i_0 and sets $i^* = i_0$ to profit from cross-selling. However, it incurs a cost

---

[2] A customer participates in the firm's offer as long as the customer surplus is greater than or equal to zero.

[3] When the solution to (2) results in $\bar{i} > i^* > i_0$, the firm follows its interior solution. When the interior solution results in a lower than i_0 information level, the firm follows a corner solution, where it may either set $i^* = i_0$ or choose not to collect any information and set $i^* = 0$.

due to distorting the information level upward and lowering the price to satisfy the participation. When the cost of additional information that is necessary to cross-sell becomes too high, the firm does not collect any information. This happens when $i_0 > \theta\alpha/(r(\alpha))$. We provide the solution of the game below. We provide the details of the solution and the proofs of the propositions in the technical appendix (available at http://mansci.pubs.informs.org/ecompanion.html).

SOLUTION. *Given a cross-selling percentage α, a firm profits from cross-selling if and only if $i_0 \leq \theta\alpha/(r(\alpha))$. For an interior solution, the optimum strategy calls for $i^* = \theta\alpha/(2r(\alpha))$ and $p^* = \theta - \theta^2\alpha^2/(4r(\alpha))$.*

The information technology decreases the minimum level of information required for profiting while increasing the amount of information that can be collected from customers; cross-selling becomes much more prevalent in information-intensive environments. For example, although customers may not reveal their physical addresses and names when they use a website, firms can still profit from the window-shopping behavior and engage in cross-selling toward specific users and computers using cookies, in addition to creative advertising and messaging.

When information risk is low, the profit potential from cross-selling becomes much more important. As information risk decreases, the relative value of cross-selling increases. As a result, a firm prefers obtaining a higher amount of information and subsidizing its customers with lower prices. At the optimum, while the obtained information level is proportional to $\theta\alpha/(r(\alpha))$, the cross-selling revenue as well as the customer information cost are proportional to $\theta^2\alpha^2/(r(\alpha))$. The firm pays a proportion of the obtained revenue to its customers to ensure their participation. This process may even result in a firm paying its customers. A firm charges its customers a price of θ with no cross-selling. On the other hand, with cross-selling, the firm needs to subsidize the customers for the cross-selling activity. When $\theta^2\alpha^2/(4r(\alpha)) > \theta$, or equivalently $\theta\alpha^2 > 4r(\alpha)$, the cross-selling profits become so high that the firm finds it beneficial to pay its customers for their information. However, when customers have high risk perceptions and $4r(\alpha) \geq \theta\alpha^2$, collecting and using information becomes expensive. As a result, customers pay a price and reveal lower information. Furthermore, customers with a higher valuation may pay a lower price compared to customers with a lower valuation when $\theta\alpha^2 > 2r(\alpha)$. This is the point where the incremental cross-selling profit becomes higher than the profit the firm obtains with its own offers.

PROPOSITION 1. *Given a fixed cross-selling level (α), as information risk increases, the firm obtains a lower*

level of information. The firm's profit decreases while price increases. A firm starts paying its customers while obtaining their information when the perceived information risk is low or the customer valuation is high, such that $\theta\alpha^2 > 4r(\alpha)$. Furthermore, as customer valuation increases, customers pay a lower price when information risk is sufficiently low, such that $\theta\alpha^2 > 2r(\alpha)$.

Firm's profit and prices might move in opposite directions. Customers obtain lower prices when the perceived information risk is low. In such cases, exchanging information helps the firms increase their profits while being able to offer lower prices. An increase in prices could suggest a lack of cross-selling ability and a decrease in firm profits. Most successful firms charge lower prices while engaging in significant cross-selling activity and increasing profits (*Business Week* 2003). In addition, customers who have limited concerns, or with more valuable information for cross-selling purposes, may pay lower prices. For example, Citibank customers with significant relationships with the bank enjoy free bill-payment services, travelers'/cashier's checks, investment consultants, and credit cards with superior benefits. In return, the company shares the information with third parties (including, but not limited to, CitiFinancial, Travelers Insurance, Salomon Smith Barney, and Primerica) and profits from many cross-selling opportunities (*The Wall Street Journal* 1999). A high-risk customer shopping through a QVC catalog may use telephone services when the customer does not like the Internet (cookies). Then, the customer is more likely to pay full prices. On the other hand, a low-risk customer can participate in a membership club when revealing additional preference information and enjoy 40% lower prices. In addition, by participating in surveys and revealing their preferences, many customers can receive gifts and certificates. Dell and Amazon customers can receive coupons and special promotions when they reveal their preferences and use more of their products. These firms advertise their low prices while obtaining high profits with cross-selling.

When a firm can decide on the extent of cross-selling (α) in addition to price and amount of information gathered, the firm can better control the information risk while maximizing its profit. The change in information risk with respect to changes in cross-selling plays an important role in the optimal strategy. In specific, the elasticity formula $\varepsilon = (dr(\alpha)/r(\alpha))/(d\alpha/\alpha)$ captures the significance of such changes. When $\varepsilon < 2$, customers are relatively insensitive to sharing information; opportunistic behavior becomes the dominant strategy, and increasing cross-selling (α) always increases firm profits. At the optimum, the slope of the revealed information (with respect to α) equals $\theta/(2r(\alpha)) - (\theta\alpha/(2r^2(\alpha)))r_\alpha(\alpha)$.

As α increases, the firm prefers a higher level of information due to a higher profit potential. The positive first term captures this. However, customers do not want to reveal information because of higher costs (represented by the negative second term). When information risk increases and $\varepsilon > 1$, customer costs increase at a higher rate than the rate at which a firm is willing to obtain more information. As a result, the firm asks for a lower level of information. However, the profit still increases when the rate of information decrease is not that high and $2 > \varepsilon > 1$. In this range, a firm prefers compensating the customers with lower prices to limit the loss of customer information. Although the information sought by the firm decreases, the profit increases as a result of engaging in a higher level of cross-selling activity. Customers are sufficiently sensitive to information sharing, and $\varepsilon > 2$ for the rest of the analysis. When customers are willing to reveal a lower amount of information and $\varepsilon > 2$, price increases and profit decreases as cross-selling level increases. At this point, a firm finds it beneficial to limit information sharing and decrease α. Consequently, customers reveal more information, which results in superior cross-selling revenue. By decreasing the cross-selling activity and committing to an optimal level, a firm can obtain high customer information ($\bar{i}$) and achieve customer intimacy. As the opportunity of obtaining high customer information ($\bar{i}$) increases, the firm limits its cross-selling level further (as part of its optimal commitment) and obtains higher profits. On the other hand, when there is no commitment, the equilibrium calls for a maximum cross-selling activity, in which case customers reveal limited information and pay higher prices, and firm profit decreases.

PROPOSITION 2. *A firm commits to limited cross-selling and increases its profits when customers are sensitive to information sharing ($\varepsilon > 2$). As the maximum level of information ($\bar{i}$) increases, the committed level of cross-selling (α) decreases, and the incentive for commitment increases. When a firm does not (cannot) commit on a certain level of cross-selling, the only subgame-perfect equilibrium calls for a maximum level of α, resulting in lower profits compared to the commitment strategy.*

Many companies explicitly reveal the extent of their cross-selling efforts. *The New York Times* and Dell are members of organizations such as BBBOnline and Truste, which provide independent monitoring and certification of the way customer information is collected and used. Many companies, such as Amazon.com, let customers control the amount of cross-selling activity by adjusting notification, recommendation, and contact preferences. QVC has strict limits on cross-selling activity: it never cross-sells more than 15% of its customers in a month

and makes a maximum of one offer per month to any given customer. When customers do not see an announced strategy or a reliable, convincing policy on cross-selling, they may expect that firms exploit information as much as possible. Although a firm may provide many free offers and services, customers may hesitate to reveal true information. For example, although NetZero provides free services (which cost upward of $20 per customer for the Internet connection), most customers feel uneasy about the overall information management practices and cross-selling efforts. As a result, customers provide misleading, false information in order to minimize possible risks. NetZero has the highest nondelivery rate of its messages in the industry with 27% (Hirschman 2003). On the other hand, when a firm cannot completely satisfy customer doubts and the commitment's credibility is an issue, regulations on information sharing and cross-selling may increase firm profits. For example, Citibank collects a high level of sensitive information from its customers. The company provides regular messages that describe information management and cross-selling strategy of the firm. In addition, they support national legislation efforts, such as the Gramm-Leach-Bliley Act, that increase the overall credibility of information management policies to reinforce the commitment strategies.

4. Conclusion

We formulate a model for database marketers in information-intensive environments and show that the collected amount of information changes firm strategies. We analyze the role of cross-selling and information exchange on price levels. We investigate how a commitment strategy can be beneficial and how firms achieve customer intimacy while at the same time engaging in cross-selling.

The results highlight the advantages of cross-selling, intricacies of customer intimacy, and provide insights for database marketers. We find that firms can obtain detailed customer information and achieve customer intimacy when committing against a certain level of cross-selling activity. As a result, profit increases while price decreases. Firms may charge no price or pay their customers in return for cross-selling. Consequently, cross-selling strategy distorts price levels. For example, customers who reveal more information or who have higher valuations may pay lower prices. The ability to commit enhances the profit of the firm, and legal requirements that necessitate such commitments actually improve the profit of the firm. Although prices decrease as a result of the increased cross-selling activity, customers limit the amount of shared information when they are not sure about the extent of cross-selling. Consequently, a firm obtains limited cross-selling revenue and a lower profit.

An online appendix to this paper is available at http://mansci.pubs.informs.org/ecompanion.html.

References

Aaker, David S., Donald E. Bruzzone. 1985. Causes of irritation in advertising. *J. Marketing* **49**(2) 47–57.

Ansari, Asim, Carl F. Mela. 2003. E-customization. *J. Marketing Res.* **40** 131–145.

Bauer, Raymond A., Stephen A. Greyser. 1968. *Advertising in America; The Consumer View.* Harvard University, Boston, MA.

Business Week. 2003. A look at the leaders. (July 28) 56.

Clemons, Eric, Il-Horn Hann, Lorin M. Hitt. 2002. Price dispersion and differentiation in online travel. *Management Sci.* **48**(4) 534–549.

The Economist. 2000. Privacy on the Internet. (May 27) 65–67.

Garbarino, E., M. S. Johnson. 1999. The different roles of satisfaction, trust and commitment in customer relationships. *J. Marketing* **63** 70–87.

Gefen, David. 2002. Reflections on the dimensions of trust and trustworthiness among online consumers. *The Database Adv. Inform. Systems* **33**(3) 38–53.

Ghose, Anindya, Tridas Mukhopadhyay, Uday Rajan. 2002. Strategic benefits of referral services. *Rev. Marketing Sci. Working Papers* **2**(2).

Harris Interactive Survey. 2002. www.harrisinteractive.com/news/allnewsbydate.asp?NewsID=429 (February 20).

Hirschman, Kenneth. 2003. Prepared Testimony before the House Energy and Commerce Committee, the Subcommittee on Telecommunications and the Internet, and the Subcommittee on Commerce, Trade and Protection on July 9, Washington, DC.

Kamakura, Wagner A., Michel Wedel, Fernando de Rosa, Jose Afonso Mazzon. 2003. Cross-selling through database marketing. *Internat. J. Res. Marketing* **20** 45–65.

Milne, George R., Marie-Eugenia Boza. 1999. Trust and concern in consumers' perceptions of marketing information management practices. *J. Interactive Marketing* **13**(1) 5–24.

Pan, Xing, Venkatesh Shankar, Brian Ratchford. 2002. Price competition between pure play versus bricks-and-clicks E-tailers: Analytical model and empirical analysis. *Adv. Appl. Microeconomics: Econom. Internet E-Commerce* **11** 29–61.

Phelps, J., G. Novak, E. Ferrell. 2000. Privacy concerns and consumer willingness to provide personal information. *J. Public Policy Marketing* **19**(1) 27–41.

Siegel, Tara. 1991. Citigroup is ready to receive the benefits of cross-selling. *Wall Street Journal* (March 15) 1.

Shim, Soyeon, Mary Ann Eastlick, Sherry L. Lotz, Patricia Warrington. 2001. An online prepurchase intentions model: The role of intention to search. *J. Retailing* **77**(3) 397–416.

Statistical Fact Book. 2000. Primary barriers to catalog purchasers. Direct Marketing Association, New York, 62.

The Wall Street Journal. 1999. Citigroup is ready to realize the benefits of cross-selling. (March 15) 1.