Case descriptions to accompany "CUSTOMER-CENTRIC MARKETING: A PRAGMATIC APPROACH" by R. Ravi and Baohong Sun © 2015

Case I: Bucket Pricing Strategies: Pre-payment plans for subscriptions with consumption uncertainty

1. Introduction

In the past decade, companies have increasingly adopted a pricing structure featured by periodically pre-paid flat fees and corresponding quotas that restrict the maximum consumption levels. Consumers are asked to choose among several plans characterized by different combinations of prices and quotas, then prepay the price specified by the chosen plan and accept the limit of maximum consumption implied by the chosen quota. For example, AOL offers a 4-hour daily dial-up plan for a monthly price of $9.95, a 10-hour plan for $14.95, and an unlimited usage plan for $25.90. If a consumer chooses the first plan, he or she prepays $9.95 a month (monthly price) and may use up to approximately 120 dial-up hours per month (monthly quota).

Because of the resemblance between such optional plans defined by quotas and flat fees and alternative "buckets" of different sizes and prices, we term this type of pricing structure *bucket pricing*. Bucket pricing appears commonly in service and subscription industries in the forms of access (e.g., health club memberships) or subscription (e.g., AOL service access) fees. It is increasingly emerging in telecommunication, cable and satellite

television, online music, and software industries. Companies like Blockbuster and Microsoft also have altered their business models by shifting a significant part of their business to online subscription services with bucket pricing.

How is bucket pricing different?

Bucket pricing differs from unit-rate pricing, whereby a consumer pays a uniform price for each unit of the product or service. Bucket pricing also differs from bundled pricing because the former refers to prepaid prices for different amounts of similar products or services, while the latter refers to a postpaid price for a combination of several different products. Finally, though the price of each bucket seems similar to the flat-rate component of two-part pricing, the two pricing formats are distinct in at least three ways. First, in bucket pricing consumption is capped by a quota, whereas two-part pricing allows for additional usage for a variable fee. Second, bucket pricing demands prepayment, whereas two-part pricing allows at least the variable fee to be paid after usage. Third, with bucket pricing, consumers make choice decisions among alternative plans that differ in size and associated price, whereas with two-part pricing, consumers determine their own usage rate because the usage fee is paid after.

Table 1. Prices and Quotas of Alternative Plans and Profit Contribution

Plans	Price	Out-standing DVDs	Consumption Capacity[2] (Monthly Quota)	Purchase Share	Average Actual Consmption[3]	Total Revenue	Total Variable Costs[4]	Total Profits
Economy[1]	$9.95	1	2	.0282	1.26	$33,352	$8446	$24,906
Lite	$12.95	1	3.2	.0425	1.53	$65,475	$15471	$50,004
Standard	$19.95	2	6.4	.8348	2.82	$1980,935	$560,024	$1,420,911
Premium	$27.95	3	9.6	.056	4.31	$186,147	$57,408.	$128,739
Advantage	$37.95	5	16.0	.0311	6.29	$140,339	$46,520	$93,819
Elite	$57.95	7	22.5	.0075	8.02	$51,402	$14,226	$37,176

1. The total monthly consumption limit of the Economy plan is limited to two.
2. Consumption capacity is approximated by the quota of plan *j* × (number of working days each month/(1 + average number of days for two-way delivery estimated by the company). This calculation assumes that it takes at least one day for consumers to watch a

movie. The calculated consumption capacity is consistent with the maximum actual consumption we observe in the data.

3. Average actual consumption is the total number of DVDs shipped to the consumer each month, adjusted by the DVDs not shipped back at the end of that month.
4. Variable cost is approximated as the sum of postage cost, or $.45 for one-way delivery and an estimated $1.1 for overhead costs.

Bucket pricing entails consumer decision processes that differ from those under unit-rate and two-part pricing structures which have been extensively studied. These distinctions are crucial because pricing structure has important implications for consumers' decision processes as well as companies' profit maximization strategy.

In Table 1, we use an example to illustrate the consumer choice behavior with buckets pricing and its non-trivial implications for profit. In the first two columns, we list the specification of monthly prices and maximum numbers of out-standing DVDs of six service plans offered by an anonymous on-line DVD rental company. From the maximum number of outstanding DVDs, we calculate the implied monthly quota or consumption capacity.[1] We use information from 10,000 randomly selected consumers to calculate the purchase shares of each plan, average numbers of movies consumed per month, total revenue, total variable cost, and total profit. According to these statistics, we note several interesting observations. First, when monthly quota increases, the monthly payment also increases but at a slower rate, indicating that the company offers volume discounts to users of higher plans. Second, the Standard plan has the highest purchase share, followed by Premium and Lite; thus, the popularity of plans does not appear to increase with the volume discount. Rather, the fee and quota seem to play a joint role in determining the popularity of a service plan. Third, across all service plans, the average actual consumption rates are barely half of the purchased consumption capacities. The magnitude of overpurchase implies an average price of $6–$8 per movie consumed, significantly higher than the average $3–$4 unit price charged by traditional DVD rental stores.

Consumers thus appear to pay a significant price premium with bucket pricing. Fourth, the amount of overpurchase increases with the quota and price of the plan. Intuitively, profit may be improved by making popular plans more profitable and/or profitable plans more popular, but the current bucket pricing menu may not be optimal because the most popular plan is not aligned with the most profitable plan.

These observations indicate that it is interesting to investigate how consumers make their advance plan choices under the uncertainty introduced by prepaid bucket pricing, and to draw some implications for the design heuristics of this novel pricing approach. Despite the increasing popularity of bucket pricing and its distinct consumer purchase decision calculus, there is lack of research and solutions considering how consumers make choices among competing plans represented by prepaid bucket pricing. Important questions that need to be answered include the following.

- How do consumers make advance purchase decisions under prepaid bucket pricing?
- Why do consumers over-purchase?
- How do consumers adapt their choices of service plan to the dynamics of their expected consumption needs?
- Is there a better design of bucket pricing that would improve profits?

2. Industry Background - Online DVD Rental Industry

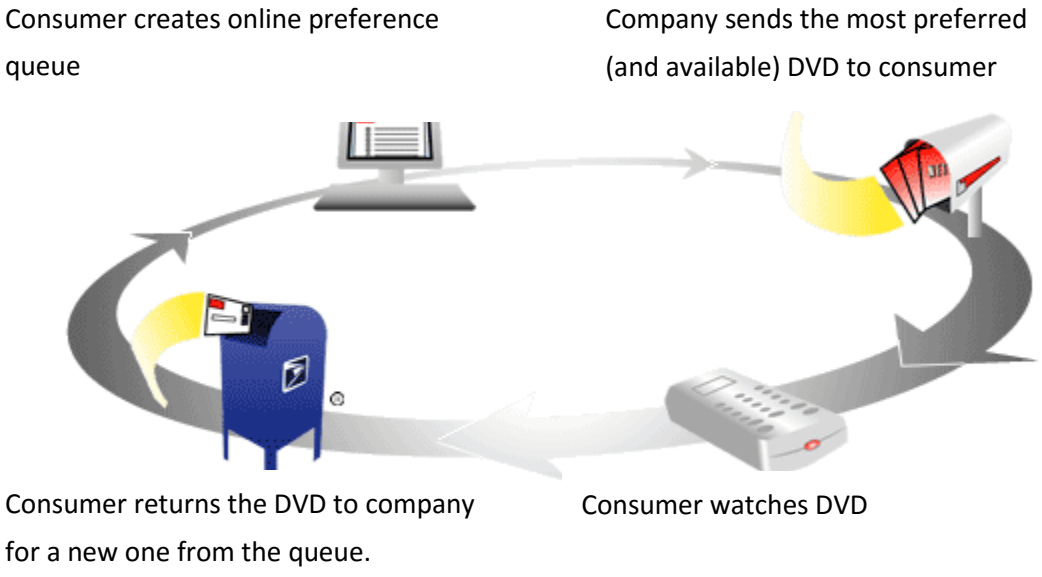
Since the founding of Netflix.com in 1998, the online DVD rental industry has grown at a breathtaking pace (E-Business Strategies, 2002). The biggest player, Netflix.com alone serves more than 3 million users, earns more than $600 million annual revenue, and hopes to expand its user base to 20 million in the next several years (Netflix 2005 Annual Report). With the entry of Wal-Mart, Blockbuster, and Amazon.com to the market, online DVD rentals now serve more than 6.3 million users who generated $1 billion revenues in the United States and Europe in 2005. It is a fast booming sector in the $10 billion home-video industry.

The online DVD rental business innovatively integrates DVD rental, Internet technology, and postal services, as depicted in Figure 1. Consumers choose among alternative plans defined by

different price/quota combinations and furnish credit card information so the company can automatically debit the monthly payments from their accounts. Once the account is established, consumers can log onto the company's web site and create queues of movie titles in the order of their viewing preference. The company then sends them the number of movies specified by their chosen plan via first-class mail.[2] Consumers can keep the movies as long as they like and don't have to pay any late fees. To return the rented DVDs, consumers simply mail them back using a postage-paid envelope provided by the company. When the company receives the returned DVDs, it mails the next movies on the queue, limited to the total number of outstanding movies allowed by the chosen plan. The same process continues until the subscription is terminated. During this process, the numbers of DVDs checked out at any given time are limited to the total numbers of outstanding movies allowed by the chosen plan (which suggest monthly quotas). Consumers may switch plans at any time by clicking on the "change" link on the company's web site. Usually, no refunds or credit are given for partial periods or unused rentals.

[2] If the number of requests for a movie exceeds the number of DVDs in stock at a particular time, the company determines to whom to send the DVDs on the basis of a priority score calculated according to a consumer segmentation rule. Consumers who have to wait are informed of the wait time, which ranges from "very short" to "very long." The company sends the next preferred DVDs on the queue that is available.

Figure 1 How Online DVD Rental Works



The increasing popularity of online DVD rentals stems from the convenience the business model creates. Compared with their patronage of traditional DVD rental stores, consumers enjoy the convenience of continuous service and automatic monthly payments, as well as the mental comfort to keep the DVDs without worrying about late fees. Because the two-way, door-to-door delivery is included in the subscription price, consumers avoid both shipping costs and the hassle of visiting a brick-and-mortar store. In addition, the low inventory cost enables the company to maintain a much larger selection of DVDs for consumers to select from. Furthermore, the consumer-managed movie queues enable the company to predict consumer demand better, maneuver DVDs more efficiently, and send consumers their preferred DVDs in a more timely fashion.

Other than the standard overhead costs and copyright fees paid to obtain a stock of DVDs, the main variable cost faced by online DVD rental companies is postage; for the rental company we study, such cost is $.45 for each one-way shipment.

2. Data Description

The online DVD rental company studied in this case provides content-edited movies from which sexual and violent scenes or offensive language has been removed. This company offers a consumer panel data containing 10,000 randomly selected registered consumers whose purchase, payment, and shipment history were tracked during a 33-month observation period from August 2002 to May 2005. For the purchase and payment histories, we observe the date when service was initiated, changes in plan choices over time, monthly payments made, and date of termination if it occurs. The shipment history contains titles of movies, date when movies were dispatched, expected arrival dates, and dates movies were received by the company. In addition, we have product- and consumer-specific information, including the genre of each movie, consumer-constructed movie queues, consumer priority scores, whether the consumer resides within the same state as the company, and the company estimated turnaround time. On the basis of the shipment information, we approximate actual monthly consumption as the total number of movies dispatched adjusted by the number of movies not returned at the end of month.

Table 2A Sample Statistics

Variables	**Explanation**	**Mean**	**Standard Deviation**
Purchase share D_{ijt}	Purchase probabilities of each service plan Economy Lite Standard Premium Advantage Elite	 .0282 .0425 .8348 .056 .0311 .0075	 NA
P_{ijt}	Monthly payment including tax	20.68	3.89
$DSCT_{ijt}$	Amount of discount off monthly payment	.50	2.72
C_{it}	Actual monthly consumption	2.71	2.37
Tenure	Number of months with the company	17.68	6.25
T1	January–March	.25	.43

T2	April–June.	.20	.40
T3	July–September.	.23	.42
D_{TAX_i}	Dummy variable equal to 1 if the consumer resides outside the state and 0 otherwise.	.07	.25

In Table 2A, we provide some sample statistics of the variables we use. As we show in Table 1, the dominant purchase share rests with the Standard plan, whereas the Elite plan has the lowest purchase share. The average monthly payment made is approximately $20.68, and price discounts, averaging $.50, are offered in approximately 2.57% of all cases. The average actual movie consumption per month is 2.71, with a standard deviation of 2.37. During the observation period, consumers stayed with the company for an average of 17.68 months. Finally, 93% of the consumers live in different states and do not pay sales tax.

Table 2B Patterns of Plan Switching

	Economy	**Lite**	**Standard**	**Premium**	**Advantage**	**Elite**
Economy	--	11.43%	77.14%	8.57%	2.86%	0.00%
Lite	23.62 %	--	66.14%	7.87%	2.36%	0.00%
Standard	16.87%	32.70%	--	30.15%	17.05%	3.23%
Premium	0.91%	7.55%	65.56%	--	24.17%	1.81%
Advantage	0.00%	2.86%	50.71%	34.64%	--	11.79%
Elite	2.30%	2.30%	37.93%	13.79%	43.68%	--

In Table 2B, we provide a switching matrix that demonstrates the frequencies and directions of plan switches among the six service plans during the observation period. We find that most switches involve a move to adjacent higher- or lower-level plans. For the Standard plan and up, more consumers switched down to lower-level plans. In contrast, for the Economy and Lite plans, more consumers switched up to the Standard or beyond.

To illustrate how consumers' purchases and actual consumption evolve over time, we plot the average purchased consumption capacity and average number of DVDs actually consumed per month over observed consumer tenure in Figure 2. Purchased consumption capacity is always significantly higher than actual consumption. Both actual consumption and purchased consumption capacity decrease as the consumer's tenure increases. This decrease in consumption capacity is consistent with our observation from Table 2B that more consumers switch from higher- to lower-level plans than vice versa; and reflects that consumers may learn about their consumption needs and adjust their purchase decisions accordingly.

Case Questions

1. Describe the history and business model of on-line DVD rental industry.

2. What is subscription pricing? How is it different from uniform pricing? What types of industries should consider adopting subscription pricing?

3. How do consumers behave under subscription pricing? How does this behavior differ from that under other pricing strategies? What implications does this have for the firm's profit maximization strategy?

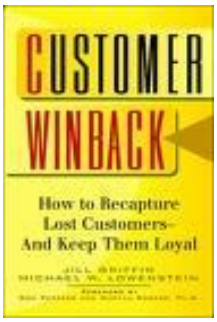
4. Use the data set to understand the customer behavior of the online rental company. Frame and investigate the answers to interesting consumer behavior questions such as the following.

    a. How can the customers be segmented?
    b. Who are the more/less profitable customers?

5. Evaluate the current design of the subscription pricing. Do you see any way to improve the design so that the profit can be improved?

6. What implications can you derive from your analysis for competing in this arena, as well as for pricing strategies for other online movie delivery services contemplated by competitors such as cable and satellite dish companies?

Case II: Customer Win-back Strategies: Is the juice worth the squeeze for defected customers?



1 Introduction

Over the last decade, Corporate America has awakened to the benefits of customer loyalty and retention, with many companies committing substantial resources for the purposes of retaining customers and keeping them happy. Yet, few companies have effective processes and programs in place to win-back lost customers or recover customers at high risk for defection. Valuable customers "fall through the cracks." To truly win long-term customer loyalty, companies should include win-back in their loyalty building strategies. There is considerable competitive advantage for companies that make win-back a fundamental part of its loyalty and retention initiatives. Win-back programs are important not only for retaining customers, they also enable a firm to realize potential sales/profits by rebuilding customer relationships, minimize new customer acquisition costs, reduce negative word-of-mouth effects, and most importantly, help to better understand the customer process for relationship termination so that appropriate intervention can be effected.

Despite its increasing importance, the win-back strategies adopted by companies are rather ad hoc and reactive. According to a recent survey by GriffinGroup, 90% of companies take such action only after the customer indicates that she is going to leave. Over 56% of the companies did not have a system for identifying high-risk customers, thus depriving their

companies of sufficient insight regarding root causes of defection. This creates high vulnerability to customer loss as well as inability to counter attrition.

The most frequently identified win back strategy is to offer additional price breaks or offer more competitive prices, followed by improved, or corrected, product/service quality to regain lost customers for the purpose of improving long-term profit in a relationship management. Intuitively, consumer retention and consumption calculus evolve over time during the customer's relationship with the firm, which has important implications for when and to what type of consumers to offer the win-back plan. The first source of dynamics comes from the fact that higher accumulative consumption rate might limit the future consumption rate because it will be harder and harder for the consumers to find her preferred DVD, which in turn will diminish the value of the service for the customer in the future. Secondly, previous work on this topic found that the consumers' price sensitivity increases as the duration of the relationship increases, which is especially true when consumers are exposed to various types of temporary price promotions. Finally, the introduction of win back plans may directly change purchase and consumption behavior of the retained consumer. If consumers are becoming increasingly more sensitive to price and over-purchase, they may increase their consumption over time to "justify" their payment for the plan, i.e., they watch at a higher rate than what is really ideal for them. This incurs substantial service costs for the company. For these type of consumers, introducing an additional plan with price discount may create a "win-win" situation: Consumers find the rescue plans more desirable because of its low payment requirement, they are happier even though their consumption rate is lower than it was previously (and getting close to their desirable consumption rate); the firm reaps a lower payment but also saves on higher costs, and the overall profit per customer increases. This implies that the firm could be better off by introducing a win-back plan to this type of consumers in a proactive way. In short, we expect consumer calculus for retention and consumption to evolve over time with accumulated consumption, the company's marketing activities such as promotions, as well as the win-back offers. Given these consumer dynamics, it is non-trivial for the company to decide

when to offer the win-back plan to what type of consumers. It is important for the company to track the development of the consumer and foresee the differential time and reason for each consumer to leave the company and offer the win-back plan to the right consumer at the right time for the intended goal of maximizing companies' long-term profit

The above discussion implies several ways for the company to improve the reactive win-back practice popularly adopted by the industry. First, knowing why a customer defected is key to determining what types of offer to make to win him/her back. For example, a customer who was pulled away because of better prices offered by a competitor has higher win-back potential if discounts are offered than a consumer who wants to leave because of the exhausted movie selection. Companies should provide incentives tailored to the specific reason of defection of each customer.

Second, during a relationship with a company, the customer's status evolves over time. As a result, their demand may change over time and their preference for marketing mix variables such as price, promotion and service quality may also shift over time. It is important for companies to track customer performance and continuously measure the risk of defection. By tracing the development path of each individual customer, the company can predict when a customer is about to leave before she actually does.

Third, if customers behave differently during their second lifetime and first lifetime, it is relevant for the company to predict how the companies' win-back offers affect their future profit contribution. Companies should only invest in winning back profitable customers and avoid wasting money on the rest. To use a metaphor, a firm needs to estimate how much "juice" (or profit) each returning defected customer would contribute. This would then have to be weighed against the "squeeze" (or the win-back offer) in order to decide whether attempting to get the customer back would be profitable to the firm.

Fourth, companies should proactively address customers with high risk for defection using a strategic recovery plan that are tailored to the firm's most updated understanding of reasons for defection and long-term customer value. Some customers respond better to a

proactive recovery plan than a reactive offer that is usually perceived as 'begging bowl' missionary contact.

The above discussion implies three integrated key components are critical to creating a successful win-back decision process. Companies need to (1) learn about why the customer defected (i.e. enables the firm to bypass customers who are ultra-price-sensitive, the so-called 'butterfly' customers), (2) take into account the lifetime value of the defected customer (i.e. invest in recovering only those customers with significant long-term value potential), and (3) develop an integrated action plan that is customized and proactive. Careful study and modeling is needed to develop tools and a framework that allows the three components to be integrated to improve the effectiveness of win-back strategies, together with rigorous controls on service costs to improve profitability. A solution to this problem can lead to a customer win-back strategy that successfully balances both service costs and long-term profit implications. This is also further enabled by the rapid development of Internet and digital technologies that have tremendously increased the amount of detailed customer information collected and created a highly interactive environment for marketing communications.

Existing marketing methods focus on static segmentation to identify consumer heterogeneity without explicitly deriving firm decisions. For example, by segmenting customers using purchase history information, companies can improve its coupon promotion campaign to maximize its (current) profit. This line of modeling results in a snap-shot segmentation of customers and score-ranking of consumers based on relevant variables. These segmentation methods are useful tools for campaign-centric win-back strategies which maximizes return of investment of campaign events that are treated independently over time. But these methods do not shed adequate light on the dynamics of customer preferences. In a recent review article in customer relationship management (CRM), Rust and Chung (2004) pointed out the fact that if the customers' preferences could shift along time, then it is important for the firm to capture such shifts and implement dynamic intervention strategies.

Some important questions to be answered are the following.

- How do consumer purchase and consumption evolve over time? How do customers differ in the first lifetime and second lifetime?
- Develop a dynamic segmentation approach to detect the risky customers.
- Develop a customized and proactive win-back strategy that maximizes customer life-time profit contribution?
- To what extent can the firm improve the effectiveness and efficiency of its marketing strategy under our proposed framework?

2 Data Description

An online DVD rental firm[3] has provided the dataset for this case study. This data set contains the rental histories of more than 10,000 users. The firm is located in a western state and specializes in renting content-edited DVDs from which violent or sexual scenes as well as strong language that might appear offensive or inappropriate to certain viewers have been removed. Due to the substantial costs that come about from editing these DVDs, the DVD selection of the firm is limited compared to other DVD rental firms such as Netflix.com and Blockbuster.com, that supply users with the original unedited versions of the movies. The number of unique titles available from this firm is less than 2,000, none having an NC-17 rating according to the Motion Picture Association of America (MPAA). Conversation with employees of the firm confirmed our belief that, relative to movies with PG or G ratings, movies with more restrictive ratings are subject to a greater amount of censoring because their original versions contain more content that the customers of the firm do not want to see. Due to this successful commitment to a niche market, the firm is able to charge its customers a higher per-rental price than that charged by either Netflix.com or Blockbuster.com. On the other hand, the rather limited selection puts the company in a rather vulnerable position in regard to maintaining long-term relationships with consumers, especially those who only want to watch a handful of cleansed movies.

[3] The name of the business is withheld for confidentiality.

When a consumer decides to subscribe to the rental service, she begins by filling an online registration form that contains her relevant information, such as mailing address and credit card number. Then she creates a "preference queue" that indicates the DVDs she would like to have sent to her, coupled with her relative preferences for these titles. For example, the first item on the list is the most preferred DVD for the consumer. After learning the preference of this customer as well as the preferences of other customers in addition to the current inventory status, the firm decides which DVD to send to this consumer. Notice that because of the limited DVD inventory and the possible competition among different queues, it is unlikely that a consumer will always get her most preferred DVD[4]. After the consumer receives the DVD and watches it, she returns it to the company using a provided, postage pre-paid envelope. When the firm receives the returned DVD, it ships the next one on the list to the consumer. Then, the process is repeated. The firm also makes sure that, at any given time, the total number of outstanding DVDs associated with a customer (i.e., DVDs that are either in this customer's possession or in the mailing process) do not exceed the quota of the specific plan that the customer currently chooses. The firm automatically charges her credit card the monthly subscription price until the customer decides to withdraw from the program.

The firm's website offers its customers four types of rental plans. The four plans, listed in an increasing order of quota (2, 3, 5, and 7) and subscription prices, are Standard, Premium, Advantage, and Elite. New users can enjoy a free-trial of the standard service for the first month, but, after that, they must choose from any of the four plans and become paying members in order to continue their service. If the customer decides to cancel their subscription, she must make a call to the customer service center. At this time the firm applies its current regaining strategy, i.e. offering two "rescue plans," called Economy and Lite. These two plans are similar in the sense that both have much lower price than any of the four regular plans, but they also have much more restrictive quota limitations. However, they differ in the aspect that

[4] When conflicts among different preference queues arise, the company employs one or more algorithms to determine which consumer's request to be fulfilled first. The details of such algorithm were not disclosed to us.

the Economy plan has a higher subscription price, but a lower per-rental price (subscription price divided by the maximum consumption allowed by the quota) than the Lite plan. The rationale for adopting this regaining strategy is that the firm knows, from its communications with some defecting consumers, that a major reason for defection is that the declining consumption rate, which makes the customer feel that the service is no longer worth the subscription fee. Notice that the offering of the rescue plans is exogenous, since it is offered to every consumer who intended to leave the service.

Table 1 Sample Statistics

Variables	**Explanation**	**Mean**	**Standard Deviation**
Purchase share D_{ijt}	Purchase probabilities of each service plan Economy Lite Standard Premium Advantage Elite	 .0282 .0425 .8348 .056 .0311 .0075	 NA
P_{ijt}	Monthly payment including tax	20.68	3.89
$DSCT_{ijt}$	Amount of discount off monthly payment	.50	2.72
C_{it}	Actual monthly consumption	2.71	2.37
Tenure	Number of months with the company	17.68	6.25
T1	January–March	.25	.43
T2	April–June.	.20	.40
T3	July–September.	.23	.42
D_{TAX_i}	Dummy variable equal to 1 if the consumer resides outside the state and 0 otherwise.	.07	.25

Table 2A. Comparisons of Consumer Behaviors Depending on Whether Attempted Defected

	Consumers Who Never Attempted Defection				Consumers Who Attempted Defection			
	Mean	Std. Dev	Min	Max	Mean	Std. Dev	Min	Max
Consumption[5]	2.85	2.01	0	25	2.87	2.21	0	22
Payment	21.07	3.71	9.97	65.59	21.29	3.50	19.88	57.95
Average Over-purchase[6]	4.17	2.56	-7.6[7]	22.5	4.34	2.67	-9.6	22.5
Average Rating	3.47	0.43	1	5	3.48	0.43	1	5
Average Priority Scores	3.69	3.84	1	148	3.52	3.75	1	111
Average Censor-Index	0.83	0.27	0	1	0.87	0.24	0	1

Table 2B Comparisons of Consumer Behaviors Depending on Whether Accepted Rescue Plan or Not

	Consumers Who Attempted Defection and Accepted the Rescue Plans				Consumers Who Attempted Defection but Did not Accept the Rescue Plans			
	Mean	Std. Dev	Min	Max	Mean	Std. Dev	Min	Max
Consumption	2.57	1.76	0	12	2.90	2.25	0	22
Payment	20.68	2.14	19.88	37.95	21.35	3.60	19.88	57.95
Average Over-purchase	4.16	2.12	-1.6	16	4.36	2.72	-9.6	22.5
Average Rating	3.47	0.45	1	5	3.48	0.42	1.5	5
Average Priority Scores	3.23	3.18	1	56	3.56	3.80	1	72
Average	0.85	0.27	0	1	0.88	0.24	0	1

[5] Table 2A measures all come form customers' first lifetimes. Table 2B measures the same variables from the second lifetime. Table 2C contains information of consumers who attempted to defect AND accepted the rescue plan offers.

[6] Over-purchase is defined as the difference between the consumption capacity and the actual consumption; where consumption capacity is approximated by the quota of plan j × (number of working days each month/(1 + average number of days for two-way delivery estimated by the firm). This calculation assumes that it takes at least one day for customers to watch a movie. The calculated consumption capacity is consistent with the maximum actual consumption that we have observed in the data.

[7] This (rare) anomaly might be attributed to some preferential treatment of the DVD rental company to some of its consumers.

Censor-Index

Table 2C. Comparisons of Consumer Behaviors in the First and Second Lifetimes

	First Lifetime				Second Lifetime			
	Mean	**Std. Dev**	**Min**	**Max**	**Mean**	**Std. Dev**	**Min**	**Max**
Consumption	2.86	2.10	0	25	1.50	1.24	0	10
Payment	21.16	3.63	9.97	65.59	12.66	3.18	8.95	39.95
Average Over-purchase	4.24	2.61	-9.6[8]	22.5	1.73	1.44	-6.8	15
Average Rating	3.48	0.43	1	5	3.46	0.54	1	5
Average Priority Scores	3.63	3.80	1	148	2.58	3.42	1	111
Average Censor-Index	0.85	0.26	0	1	0.83	0.33	0	1

Case Questions

1. Discuss the importance of win-back strategies. What are the recent trends in the deployment of such strategies?

2. What are the underlying factors that drive customers to defection? What percentage of the total number of customer defections can be attributed to each factor?

3. Do any identifiable consumption patterns exist that differ across customers who (1) never defected; (2) defected, but were not rescued; or (3) defected, but were rescued?

4. What is the relationship between the customer's first and second lifetime values?

5. What factors may cause consumer segment membership to change over time? Or in other words, what may cause consumption and retention decision process to change?

6. How does a firm design the most effective regaining strategy in order to create the highest value for each customer segment?

7. Use the data set to understand the customer behavior from the given data set. Frame and investigate the answers to interesting consumer behavior questions such as the following.

    a. How can the customers be segmented?
    b. How can the company track dynamically changes in the state of the customers?
    c. Who are the more/less profitable customers?
    d. Who are most likely to respond to win-back efforts?

8. Evaluate the current design of the win-back strategy. Do you see any way to improve the design so as to improve response rate?

Case III: Cross-selling Campaign Management: Introducing the Right Financial Product to the Right Customer at the Right Time

1 Introduction

Many companies implement scheduled and budgeted cross-selling campaigns. The status quo in the industry can be summarized as follows: First, the company schedules a cross-selling campaign and sets a budget for this campaign. Then, market researchers develop a customer response model based on multiple regression or a consumer choice model. The left-hand side of these models is the purchase/non-purchase decision and the explanatory variables in the functions on the right hand side are customer demographics. Upon estimation of the customer response model an expected profit function is set up where the predicted purchase probability determines expected revenue. The company sends campaign to customer for whom the expected profit is positive. If the company has to heed a budget constraint then not every customer with positive expected profit can be addressed in the campaign. A decision is made on an appropriate threshold in order to stay within the budget. Given a campaign budget, these companies segment the customers and select a number of consumers who are most likely to respond or most profitable and send the campaigns to these selected customers: we term these current cross-selling practices “campaign-centric.”

Despite the increasing investment in cross-selling effort, companies find that million-dollar marketing campaigns often fail to generate the responses necessary to create revenue or even recover the cost of the campaign. The average response rate as measured by a customer purchase within three months after cross-selling campaign is about 5%. Cross-selling companies

are challenged by how to improve the effectiveness of cross-selling campaign in a cost efficient way. Managers are left with many puzzling questions: How can the company design the most relevant cross-selling campaign that is tailored to each customer's evolving needs and preference? How can one improve the average response rate of a cross-selling campaign? How can the firm evaluate the effectiveness of its cross-selling efforts? How can one improve long-term profits in a cost effective way?

Salient Features of Cross-Selling Campaigns

In order to address these questions, it is important to understand the fundamental role of a cross-selling campaign and how it interacts with customer purchase decisions. Intuitively, the cross-selling should be used to build good relationship with the customer, as the result of which the customer will purchase more products and contribute more to the company's total profit. To effectively build the relationship in an efficient way, cross-selling campaigns should be designed to introduce the right product to the right customer at the right time via the right channel. To achieve this, the company needs to follow the development of each individual customer, develop detailed knowledge on customer preferences, and generate solicitations that are relevant to the current status and revealed preferences of each individual customer. These steps help build a stronger one-on-one relationship by offering targeted messages, individualized media, and specially tailored products and customized pricing to each individual customer. The right implementation of cross-selling campaigns requires much more than choosing the best customers for a planned campaign. Since these steps follow customer's developing history with the company and are customized to individual customer preference, we term this "customer-centric cross-selling."

Comparing with campaign-centric cross-selling campaigns, the customer-centric campaigns should have the following properties. First, most existing cross-selling models that predict the next-to-be-purchased product derive the probability of purchase using current product ownership and customer demographics. The underlying assumption is that customers with similar demographics should own similar products. However, as demonstrated by several

marketing researchers in recent years, customers' demand for various (financial) products seems to be governed by a latent and evolving (financial) demand state or maturity, which develops over time with change of life-stage, accumulation of consumption experience, available financial resources, learning of a particular product, etc. (E.g., a detailed discussion can be found in Li, Sun and Wilcox 2005 available from Prof. Sun's homepage). The evolving latent demand maturity represents an individual customer's readiness for a particular product at a certain time. It is an important predictor for products that are most likely to be purchased at a certain time by a particular customer and likely to lead to a better understanding of the effect of timing on cross-selling opportunities.

Cross-selling campaigns are important vehicles to reach customers. With the growing amount of customer tracking data available via CRM systems, it is an important addition to the existing business practice to explicitly investigate the effectiveness of cross-selling campaigns which are under direct control of cross-selling companies and interact with customers' purchase behavior. Given that cross-selling campaigns have the effect of cultivating customers' needs and are part of the multiple stage customer education program, it is crucial to take into account the indirect cultivation effect of cross-selling campaign in order to more accurately evaluate the effectiveness of cross-selling campaigns.

Second, different from promotion campaigns of frequently purchased products which are designed to attract immediate purchases, cross-selling campaigns for non-frequently purchased products may have the indirect effect of cultivating customers' needs that are part of a multi-stage long-term customer relationship management, as well as educating them about the features of such products. For example, financial services companies often send initial solicitations that produce requests for more information. These requests are then followed by an introductory offer and a follow up promotion. In this case, cross-selling campaigns affect customer demand for the campaigned product in several ways.

Third, customers may have different preference for different campaign channels. Given the budget of acquisition is usually limited, it is important to take into account the

heterogeneous customer preferences for multi-channel campaign in order to improve campaign efficiency.

Fourth, cross-selling is an important part of long-term customer relationship management with the goal of maximizing total profit throughout the entire customer lifecycle. This requires the company to be able to predict the future profit potential of current customers and to be willing to forgo short-term campaign cost in order to maximize long-term profit. The decisions satisfying the above goals should be a sequence of efficient and effective campaign decisions that are inter-temporally related and are state-dependent. There is very little work currently on cross-selling efforts that study profit implications. The closest related literature is the one concerning customer lifetime value analysis. This research calculates net present value of customers' future profits and treats them as another segmentation variable to guide targeting strategies for a scheduled campaign. Although future profit is taken into account, this net present value approach is still an *ad hoc* segmentation strategy, which is different from a forward-looking company that strategically makes multi-state and multi-channel cross-selling campaign decisions over a period of time in order to maximize long-term return of cross-selling campaigns.

Existing marketing research has focused on developing methodology to better predict purchase probabilities for the product-next-to-be-purchased, or next-to-be-cross-sold. Methodologies have also been developed in the data mining literature to find the best customers for a scheduled campaign with the goal of increasing sales. However, following the previous discussion current practice and research on cross-selling can be improved in several ways, which we encourage you to think about in this case.

To summarize, the goal of this case is to provide a deeper understanding of customized and dynamic cross-selling campaigns aimed at increasing long-term profit. We hope you'll understand by studying this problem that the company's decisions form a cross-selling campaign strategy to inform **when** to target **which** consumer with **what** product using the best campaign channel (**how**). The suggested cross-selling strategies will then be both more

effective and efficient while exploiting the vast amount of data and computing tools available in an intelligent and effective way.

2. Data Description

The data for this case is provided by a large regional bank which offers complete retail banking services. It consists of monthly holding and transaction history of about 20 financial products from November 2003 to November 2004 for 1 million households who use this bank as primary bank. In addition, we have access to demographic information for each of these households. Most importantly, for each household, we observe the type, channel and frequency of cross-selling campaigns it received every month and the purchases of additional financial products. Because our data was at the household level, we observed repeat purchases.

Although the bank offers 20 financial products, there are 11 products without any purchases during the 13 months observation period.[9] In order to avoid the problem of data scarcity as found for purchases history of durable goods, we only focus on products with more than 29 purchases in the observation period. This yields 6 products, namely checking (C), saving (S), credit cards (M), lending (L), brokerage (B), and others (O). These 6 products are good representations of financial products that are designed to cover various financial needs of households. Since we cannot determine whether these repeat purchases represent true repeats by the same individual or new purchases by someone else in the household, we can set our analysis at a household level and develop a model to accommodate repeat purchases accordingly.

Refer to Tables 1A and 1B summarizing the data. A brief description of the variables used in this case is shown in Table 1. Out of all the observation occasions, we have .7%, .6%, .2%, .2%, and .6% purchase occasions for checking, saving, credit cards, lending, and others. The

[9] Note data scarcity is commonly found in purchases of durable goods or financial products.

households received an average of .8, 1.9, 1.8, and 4.8 cross-selling solicitations to cross-sell checking, saving, credit cards, and lending. Among these campaigns, 21% are through email and only 1.2% are through email. Via a rough comparison of the solicitation frequencies with the frequencies of the purchases across financial products, we do not find households' purchases of financial products increase with the company's cross-selling effort (the numbers actually show negative correlation). For example, the bank sent out an average of 4.8 solicitation messages to cross-sell lending services, the most among all products. However, the purchase frequency of lending service is the lowest. This observation is consistent with the puzzle faced by many companies conducting cross-selling campaigns: why don't cross-selling efforts pay off?

On average, households have been staying with the bank for 57.27 months, which is equivalent to 4.5 years. They have an average of $8,250 total balance in the bank. To better demonstrate the sequential demand for various financial services, we exhibit in Table 1B the percentages of having j as the product next to be purchased conditional on the product last purchased. It is a 6x6 conditional table showing how frequently households purchase product *j* given that its last purchase was each of products. We also report the total number of current ownerships and new purchases of each of the *J* products. For example, we observe that owning a savings account, the customer usually goes for a CD or another saving account.

Table 1A. Definition of Variables and Sample Statistics

Variables	Explanations	Calibration Sample		Holdout Sample	
		Mean or Freq	Std.	Mean or Freq	Std.
	Purchases Transactions				
	Checking (C)	0.038	0.190	0.035	0.184
	Saving (S)	0.031	0.174	0.036	0.185
	Credit Cards (M)	0.010	0.101	0.010	0.097
	Lending (L)	0.009	0.095	0.010	0.102
	Investment &Other (I)	0.035	0.183	0.031	0.173
	Average Account Balance				
	Checking (C)	3771.8	12838.8	3218.9	7076.9
	Saving (S)	8957.6	24034.9	8393.6	19111.7
	Credit Cards (M)	1459.9	11516.5	1493.9	3648.6
	Lending (L)	31545.5	66971.5	33758.6	41197.2
	Investment &Other (I)	7429.4	32243.0	13194.8	112223.4
	Number of Mail Solicitations				
	For Checking (C)	0.016	0.130	0.016	0.126
	For Saving (S)	0.025	0.157	0.036	0.188
	For Credit Cards (M)	0.033	0.225	0.053	0.273
	For Lending (L)	0.065	0.323	0.076	0.378
	Investment &Other (I)	0.220	0.539	0.216	0.533
	Number of Email Solicitations				
	For Checking (C)	0.001	0.027	0.002	0.069
	For Saving (S)	0.001	0.029	0.001	0.042
	For Credit Cards (M)	0.002	0.052	0.022	0.231
	For Lending (L)	0.006	0.134	0.026	0.288
	Investment &Other (I)	0.015	0.153	0.016	0.181
	All Mail Solicitation	0.256	0.534	0.283	0.585
	All Email Solicitation	0.011	0.098	0.026	0.233
	Demographic				
	% of Asset outside the Bank	0.563	0.150	0.521	0.131
	Tenure with the Bank	49.113	43.974	47.772	37.207
	Number of transactions	1.220	0.921	1.151	0.951
	Cost and Profit				
	Average Account Cost	15.396	101.48	14.299	75.422
	Average Account Profit	2.684	109.34	1.892	81.420

Table 1B. Sample Transition Matrix

Product Category		Current Period – New Purchase					
		C	**S**	**M**	**L**	**I**	**Total**
Last Period – Product Ownership	**C**	0.52% (48)	0.15% (14)	0.04% (4)	0.03% (3)	0.36% (33)	230
	S	0.47% (44)	0.42% (39)	0.09% (8)	0.01% (1)	0.34% (32)	719
	M	0.19% (18)	0.22% (20)	0.09% (8)	0.04% (4)	0.15% (14)	501
	L	0.16% (15)	0.09% (8)	0.04% (4)	0.19% (18)	0.12% (11)	306
	I	2.36% (219)	2.37% (220)	0.75% (70)	0.67% (62)	2.41% (224)	7525
	Total	344	301	94	88	284	

Additional Data

1. Monthly costs for various accounts:

Checking: 17.4075383
Saving: 12.1031588
Credit cards: 1.4222172
Loans: 114.7901192
CDs: 8.9034714
Investments: 14.4330806
Others: 3.9883369

2. Profit margins:

Monthly margins for checking, saving, credit cards, lending, CDs, investment and others are $14.87, $15.73, $1.54, $-15.65, $3.76, $20.02, and $2.76 respectively.

3. Marketing costs:

Costs for postal mail and email solicitation are about $0.50 and $0.05 per message.

Case Questions

1. Describe the history and business model of cross-selling effort of banking industry. What are the challenges and new trends in cross-selling in this arena, and more generally?

2. What consumer behavior patterns provide the bases for cross-selling?

3. What is the role of cross-selling campaigns as part of a broad marketing strategy? How do customer-centric cross selling efforts differ from campaign-centric ones?

4. In what ways do cross-selling campaigns influence customer demand?

5. What are some preferred customer channels for cross-selling campaigns?

6. Use the data set to understand the customer behavior from the bank data set. Frame and investigate the answers to interesting consumer behavior questions such as the following.

    a. How can the customers be segmented?
    b. Who are the more/less profitable customers?
    c. Who are most likely to respond to cross-selling efforts?

7. Evaluate the current design of cross-selling strategy. Do you see any way to improve the design so as to improve response rate?

Case IV: Service Allocation Strategies: Turning cost centers into profit magnets by adaptively learning customer preferences

> Of concern for U.S. companies considering offshore outsourcing is that 65% of American consumers would alter their buying behavior toward a company if they know or had the impression the business was using an offshore service center. As American companies consider opening call centers in other countries to serve and sell to U.S. customers, they would be wise to weigh their expected cost benefits against the possibility of potentially alienating their American customers. With this in mind, companies would be prudent to view their customer support call centers as crucial elements of their customer strategy, akin to marketing and loyalty programs.
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> *—Call center study led by Purdue University's Center for Customer-Driven Quality, 2004*

1. Introduction

Call centers were born of a basic need: Answer in-bound customers' questions. In 1972, Continental Airlines asked the Rockwell Collins division of Rockwell International (now Rockwell Automation) to develop the first automated call distributor, thus launching the call-center industry. Today, all *Fortune* 500 companies have at least one call center. A total of 2.9 million agents are employed at 55,000 facilities in North America, and more than $300 billion is spent annually on call centers around the world.

Cost centers or profit magnets?

Because call centers initially were built to deal with customer inquiries, their management traditionally has been considered little more than a cost to be minimized. This

attitude led to the increasing popularity of outsourcing. Currently, more than 3 million agents are employed overseas, and this number is predicted to increase by 10% per year (McKinsey Quarterly 2005). Most of the outsourced operations are concentrated in Canada, the Philippines, and India. Early adopters of outsourcing have achieved savings of 40% or more, generally operating at significant scales. However, a recent survey by Purdue University (2004) indicates that despite the significant cost savings, both consumer and business customers report significantly lower satisfaction ratings with outsourced call centers. Some of the top problems reported are "less well trained staff" and that agents "were unable to resolve problem." The survey further shows that 65% of American consumers would alter their buying behavior toward a firm if they knew or had the impression that it was using an outsourced service center. Outsourcing firms have realized that the initial savings of driving down costs is offset by alienating customers; In some cases, customer defections and hidden costs outweigh the potential savings derived from outsourcing (*Offshore Digest* 2005). Although some companies continue to increase their investments in outsourcing, others, such as Dell Computer and Delta Airlines, recently took back their call-center operations from outsourced vendors.

The outsourcing controversy thus calls for research to evaluate human reactions to outsourced centers and possibly provide innovative approaches to more effectively utilize less expensive off-shore centers. However, call allocation historically has remained within the operation management research domain, with its focus on capacity costs and consideration of more efficient ways to engage in call routing, call waiting, queuing, and staffing. Customer responses to service allocation such as customer satisfaction, retention, and repeat purchase are simply described as constant or linear functions. Therefore, though mature operations management literature significantly advances understanding of efficiency in managing capacity, this stream of study does not evaluate the human reaction or the marketing consequences of service allocation decisions.

Furthermore, call centers and their recent successors, contact centers, have gone through significant transformations in both their corporation functions and technological

capabilities. Contemporary call centers handle customer surveys, telemarketing, product inquiries, sales, transactions, promotions, cross-selling, advertising, and post-purchase service via telephone, e-mail, fax, or Web pages. Statistics shows that 80% of a firm's interaction with its customers comes through call centers, and 92% of customers form their opinions about a firm on the basis of their experience with call centers (Purdue University Report, 2004). Today's call centers perform an integrated marketing function and are becoming a preferred and prevalent channel for interacting with potential and current customers to acquire and retain business, grow sales, and increase profit. Thus, more study is needed to recognize the role of call center management in growing customer relationships and firm profit.

Most importantly, call centers were fueled by the advent of software-based routing and customer relationship management (CRM) applications. The call center industry is among the first industries to become equipped with the most advanced technology, which offers them the capabilities of storing detailed customer history, retrieving real-time customer information, automatically analyzing customer preferences, and instantly responding with highly customized intervention decisions. For example, the wide adoption of the sophisticated automatic call distributor (ACD), an automated switch designed to route calls, allows managers and supervisors to monitor and measure the progress and flow of work done by agents, routinely collect information on each agent's call length and the time it takes the agent to wrap up the call, analyze a wealth of statistical models about agent and team performance, and automatically route calls. With the increasing availability of rich customer information and the increasing importance for call centers to build customer relationship, managers are seeking customer information management and analytical decision making tools to transform their existing ACD systems into customer revenue growth systems.

In short, call centers has shifted from a cost to be minimized to one of the most crucial corporate assets because of their ability to grow customer relationships and firm profit. It is then important to find business solutions to improve service quality and enrich customer interaction, together with rigorous controls on service costs to improve profitability. Both

effectiveness and efficiency—that is, the capacity to provide the best response to customer contacts at the lowest cost—are important. A solution to this problem requires a customer service strategy that successfully balances both service costs and marketing consequences. In a specific application of service allocations to offshore centers, several important issues arise.

- How do customers evaluate the performance of offshore service centers?
- What is the relationship among service allocation, service costs, and customer retention?
- How can a firm use the most recent information and interaction to learn about customers and continuously improve its relationship with customers to maximize long-term customer lifetime value?
- Is there a way to use offshore centers better without significantly jeopardizing customer retention?

2. Data Description

The data for this case study is provided by a firm that sells DSL services to both residential and business customers. Typically, customers pay a one-time fee to obtain the necessary equipment, such as a modem and software to start the service. After the initial setup, they pay a monthly subscription fee to maintain their access and attain 24/7 live customer support. Customers can dial in at any time to ask questions without paying additional fees. Depending on the speed of the modem, customers typically pay either $49.95 or $29.95 in monthly fees. The initial subscription sometimes requires a one-year contract, but customers can terminate the service at any time, with a fee if the contract is terminated prematurely.

This firm operates service centers in the United States and globally. For simplification, we treat all service centers within the continental United States as onshore service centers and those outside as offshore service centers. In addition, we classify customer questions into technical and transactional questions. Technical questions include software or hardware related issues; questions regarding installation, dial-up, user identifications, or passwords; and downed services or network outages. Transactional questions include inquiries about billing, email accounts, product news, product services, and registration.

When agents begin working, they log on to the center's computer system, which retrieves the agent's profile and case handling history, or capabilities. The ACD system automatically routes an incoming call to the agent with the lowest estimated service costs, measured by average service duration. We term this type of routing rule "cost-based" routing. When a customer calls in, he or she may experience some waiting time before an agent addresses the call (the customer does not know for which center he or she is waiting). After a call is picked up by an agent, the customer describes his or her question, and then the agent provides solutions. When a call cannot be solved in a timely fashion, the customer may be put on hold while the agent processes the case offline or sends it to higher-level managers. This scenario occurs more frequently at offshore centers, where front-line agents have less authority to make decisions, which results in more cases being escalated to supervisors. The service duration is defined as the total time of the service encounter—from the time the phone is picked up by an agent to the time the problem is solved. This includes time speaking with the customer, time during which the customer is "on hold" and the agent is processing the customer's request. This measurement is the same as the firm's data collection. It is also consistent with the firm's calculation of service cost that is primarily based on labor costs and the total time agents are occupied with a case.[10]

The calibration sample contains information about 9,643 calls initiated by 2,106 randomly selected customers who made at least 2 calls between January 2003 and December 2003. Our holdout sample contains 1,053 customers who made a total of 4,661 calls. The data

[10] Our definition of service duration includes both talking time and (possible) holding time. We do not include waiting time as part of the service duration because from the firm's perspective, only talking time and holding time keep the agent occupied and directly affect service costs. Other than some negligible phone costs, waiting time does not incur labor costs under the ACD system. However, we do include waiting time as part of customer service experience in the retention equation to take into account its effect on customer attrition. Accordingly, when we run the simulations, we consider the different waiting times caused by service allocation decisions. In addition, because of the way the company collects data, we could not separate talking time from holding time. This is a limitation of our data set.

provide detailed call histories, satisfaction survey results, demographic information, and retention decisions of each customer during the 52 weeks. In the call history panel data, we have access to information about each call, such as time stamps, call reasons, call duration, call-center representative, call-center manager, and caller's location. Furthermore, customers were randomly selected by the company to participate in a satisfaction survey conducted between January and March, 2003. These survey data contain overall satisfaction scores, as well as detailed satisfaction scores to rate their overall previous experiences with the company. Most customers participated in only one satisfaction survey. In addition, the customer demographic information includes tenure with the firm, region, life stage segment, education, and number of computers. We also observe whether a customer left the firm during the observation period. Finally, the firm provided estimates of average service costs, calculated on the basis of the call-center agent's wage and other variable costs, such as overtime pay. The average cost per minute of offshore centers is roughly two times less than that of onshore centers.

Table 1A. Variable Definitions and Sample Statistics

Variable	Definition	Mean (Std)
SAT	Overall satisfaction rating of the overall service satisfaction quality of the firm.	3.40 (1.29)
RET	Dummy variable indicating whether the customer disconnects services in each month: 1=retain, 0=leave.	0.84 (0.36)
TENURE	Number of months with the service provider since first purchase.	20.29 (12.37)
PRICE	Price of the product plan.	43.91 (7.80)
PROM	One-time price promotion for the product.	4.13 (15.97)
COMPET	Dummy variable indicating the presence of competitive offer.	0.17 (0.37)
PENALTY	Penalty fee for terminating a contract prematurely.	99.00 (0.00)
NCOMPUTER	Number of computers owned by the caller.	1.63 (0.77)
EDU	Caller expertise self-rating: 1=extremely inexperienced/novice; 5=extremely experienced/expert;	3.11 (1.02)
RESIDENTIAL	Whether the caller is a residential customer.	0.62 (0.49)
NCALLS ($\sum_{t=1}^{T}\sum_{k=1}^{K} D_{ikt}$)	Total cumulative number of calls.	6.01 (18.15)
TECHNICAL	Whether the call is about a technical question.	0.90 (0.30)
FREQ_OFF	The recency weighted frequency of being serviced by offshore centers.	0.30 (0.40)
WAITING	Waiting time in minutes.	0.81 (0.24)

Table 1A lists the variable definitions and sample statistics. The average satisfaction score is 3.40 with a standard deviation of 1.29, and 16% of customers left during the 52 weeks of the observation period. The average tenure with the company is 20.29 months, and the average monthly price is $43.91. The firm occasionally offers price promotions, averaging $4.13 in 18.81% of all observation occasions. We code the presence of a competitive product as 1 if cable was introduced to the geographical area in which the customer resides and 0 otherwise;

17% of the observation occasions occur in the presence of a competitive offer. Customers paid $99 to terminate their contract prematurely in 1.58% of all observation occasions. Mostly (62%) residential as opposed to business, these customers initiated an average of 6.01 service calls per person, and 90% were technical questions. The average waiting time, divided by four time periods during a day (8–12, 12–16, 16–20, and 20–24), for both centers are approximately 2, 1, 2, and 0.5 minutes for the onshore centers and 1, 0.5, 1.5, and 0.5 minutes for offshore centers.

Table 1B. Frequency Distribution of Calls

Frequency Distribution of Calls	Percentage of Customers	Question Type		Duration		Retention Prob.
		Transactional	Technical	Transactional	Technical	
2	23.96	0.09(0.29)	0.91(0.29)	10.35(25.57)	30.05(34.91)	0.88(0.13)
3	20.89	0.12(0.32)	0.88(0.32)	8.14(21.72)	31.06(34.91)	0.87(0.17)
4	16.27	0.11(0.32)	0.89(0.32)	7.72(21.19)	32.08(35.16)	0.86(0.18)
5	12.12	0.12(0.33)	0.88(0.33)	8.46(23.11)	30.46(35.03)	0.87(0.16)
6	8.99	0.12(0.33)	0.88(0.33)	8.93(23.41)	31.40(35.24)	0.86(0.18)
7	5.48	0.09(0.29)	0.91(0.29)	9.41(22.89)	30.02(34.46)	0.87(0.17)
8	4.18	0.09(0.28)	0.91(0.28)	8.08(20.51)	29.47(33.85)	0.86(0.19)
9	2.34	0.06(0.24)	0.94(0.24)	10.93(26.39)	30.95(35.40)	0.88(0.12)
10	1.84	0.06(0.24)	0.94(0.24)	12.27(26.32)	30.69(34.19)	0.78(0.33)
10+	3.93	0.07(0.26)	0.93(0.26)	11.48(24.96)	37.77(38.07)	0.88(0.13)

To demonstrate whether frequent callers differ from infrequent callers, in Table 1B, we compare percentages of question types, corresponding service duration, and retention rates across those who made different numbers of calls during the observation period. There is no significant variation in the types of questions and retention rates between frequent and infrequent callers.

Table 1C. Comparative Advantages[1]

	Onshore[1]			Offshore		
	Overall	**Transactional**	**Technical**	**Overall**	**Transactional**	**Technical**
ALLOCATION	0.84	0.11[2]	0.89	0.16	0.03	0.97
	(0.37)	(0.32)	(0.32)	(0.37)	(0.18)	(0.18)
DUR	20.46	6.39	22.32	37.62	44.20	36.28
	(27.80)	(17.61)	(28.37)	(24.69)	(31.79)	(24.45)
SAT	3.46	3.39[3]	3.32	3.11	3.11	3.33
	(1.27)	(1.16)	(1.25)	(1.39)	(1.40)	(1.27)
COURTESY	4.44	4.26	4.46	4.27	4.00	4.27
	(0.93)	(1.03)	(0.93)	(0.98)	(0.01)	(0.99)
LANGUAGE	4.22	3.96	4.23	3.77	3.75	3.77
	(0.99)	(1.10)	(0.99)	(1.27)	(0.96)	(1.28)
CONCISE	4.01	3.74	4.03	3.25	2.75	3.26
	(1.17)	(1.26)	(1.16)	(1.47)	(1.71)	(1.46)
UNDERSTAND	3.94	3.72	3.95	2.83	1.50	2.87
	(1.25)	(1.30)	(1.25)	(1.60)	(0.71)	(1.60)
ACCURATE	3.72	3.52	3.73	2.87	3.00	2.87
	(1.41)	(1.36)	(1.41)	(1.54)	(1.63)	(1.55)
TECH	3.51	3.54	3.58	3.50	3.33	3.18
	(1.25)	(1.22)	(1.25)	(1.13)	(1.28)	(1.13)
PERSONALIZED	3.84	3.80	3.84	3.08	4.00	3.07
	(1.29)	(0.79)	(1.36)	(1.47)	(1.41)	(1.47)
ABILITY	3.55	3.50	3.56	2.76	3.00	2.76
	(1.49)	(1.58)	(1.49)	(1.59)	(1.63)	(1.58)
HOLDTIME	3.22	3.22	3.22	2.51	3.22	2.49
	(0.77)	(0.68)	(0.78)	(1.16)	(0.65)	(1.16)
RET	0.88	0.91	0.87	0.83	0.82	0.84
	(0.31)	(0.29)	(0.31)	(0.36)	(0.38)	(0.36)

1 We classify customers as onshore or offshore using the recency weighted percentage of calls handled by both centers. A customer is classified as offshore if his or her calls were mostly routed to offshore centers. Using a similar approach, we classify customers according to the type of questions they ask. If most calls are about transactional questions, that customer is classified as asking more transactional questions.

2 The percentage of questions handled by onshore centers that are transactional questions.

3 Overall customer satisfaction score among all the customers who were serviced mostly by onshore centers and asked mostly transactional questions.

In Table 1C, we list and compare the allocation, service duration, customer satisfaction, and retention between centers and question types. The current routing results in 84% of calls being assigned to onshore service centers and 16% being handled by offshore centers. Among the questions, 11% are transactional, onshore questions, but only 3% go to offshore centers. Given that approximately 10% of the incoming calls are transactional, it appears that cost-based routing results in more transactional cases being routed to onshore centers, which average 6.39 minutes for transactional questions and 22.32 minutes for technical questions (cf. 44.20 and 36.28 minutes, respectively, for offshore centers). The longer duration at the offshore centers could be the result of training differences or the lower authority of offshore agents to make decisions, which results in longer service durations, increased hold time, and more frequent case escalation. Despite the longer time offshore centers require to solve both types of questions, the difference in technical questions is much lower than that for transactional questions.

Between centers, the difference in the mean overall satisfaction scores (onshore 3.46, offshore 3.11) is significant at the t = 2.22 level, so customers are less satisfied with offshore service centers. The sub-satisfaction scores show that the major factors causing this overall difference are the agents' difficulty in understanding questions, lack of ability to provide clear and concise answers, and lack of ability to provide a personalized and courteous response. In terms of customer retention, frequent service by offshore service centers leads to higher average customer attrition (17%, versus 12% for onshore, t = 12.6). Thus, customers prefer onshore centers in terms of both satisfaction and retention. However, the extent of this onshore preference differs across question types. Although customers are significantly less happy when offshore centers handle their transactional questions (3.39 vs. 3.11, t = 18.42), the difference in satisfaction scores is insignificant for technical questions (3.32 vs. 3.33, t = 0.67). Furthermore, customers are much less likely to leave when the offshore centers handle technical questions (0.91 vs. 0.82 with t = 11.27 for the difference of on-shore centers and 0.87 vs. 0.84 with t = 4.57 for the difference of off-shore centers.

In short, this analysis provides preliminary evidence that though it takes more time for offshore centers to solve both types of questions, the difference for technical questions is much smaller. Taking into account the significant lower marginal service cost, the offshore centers in our data set have advantages compared with onshore centers for handling technical questions in terms of service cost. In addition, though customers prefer to be serviced by onshore centers, according to their satisfaction and retention ratings, they are less sensitive with regard to technical questions. Your task is to propose a framework to demonstrate how a firm can use its offshore centers effectively by learning about customer preferences and matching customers to the most appropriate centers.

Additional Data

The unit cost for offshore call per minute is about $0.15 and that for onshore call is about $0.45.

Case Questions

1. Describe the history and business model of call center industry.

2. What characterizes today's call center industries? What are the challenges and opportunities?

3. Is service allocation a marketing decision or an operational one? How and why?

4. How do consumers behave with respect to allocation of the service of their calls?

5. Use the data set to understand the customer behavior. Frame and investigate the answers to interesting consumer behavior questions such as the following.

    a. How can the customers be segmented?
    b. Which customers are more/less likely to be retained?

6. Comment on the allocation resulting from the current call routing strategy. Can it be improved in any way?