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To Sell or Not To Sell: Determining the Tradeoffs between Service and Sales in Retail Banking Phone Centers

by
O. Zeynep Akşin
Patrick T. Harker

The Wharton School
University of Pennsylvania

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sales activities, cross-selling can have detrimental effects on customer service due to the
additional load it creates on the system. It is furthermore demonstrated that designing the
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determining the success of a cross-sell program.

[1]Zeynep Akşin at the Technology Management Area, INSEAD, Boulevard de Constance, 77305
Fontainebleau Cedex, France.

Patrick Harker is at the Department of Operations and Information Management, The Wharton School, University
of Pennsylvania, Philadelphia, PA 19104-6366.

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O. Zeynep Akşin [*]   Patrick T. Harker [†]

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[†]University of Pennsylvania, Department of Operations and Information Management, The Wharton School, Philadelphia, PA 19104-6366

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1   Introduction

Throughout the financial services industry, the call center is being recognized as a critical
delivery channel, helping firms to keep existing customers, expand their business, and control
costs (Bank Automation News, 1995). Today, the traditional role of call centers as a question
and answer base for the customer is still a strong motivator for their existence. There is,
however, a growing tendency to blend sales related activities with the traditional transaction
based activities at a financial service firm's phone center. Many institutions view turning a
service request into an opportunity to sell additional products as the key to a successful phone
center operation. While service-oriented businesses beyond the boundaries of the financial
services industry are experiencing a similar proliferation in call centers, the dichotomy of a
service center and a sales center is much more apparent in this setting. In particular, we
see that phone company operators or IRS service centers predominantly engage in customer
service oriented transaction processing, while retailing phone centers, like L.L. Bean's, remain
as pure sales organizations. The desire to fully blend service and sales in a call center
operation seems to be unique to the financial services industry.

The move to sales elsewhere in the financial services industry has been ongoing for some

time. Focusing on retail banking, one observes that sales is a relatively new concept. Increased deregulation in the industry has led to a growth in competitive pressure, which in turn has forced bankers to incorporate sales into their daily operations. The last decade has seen a growing number of banks implementing cross-sell programs across their branch networks in an effort to become sales-driven organizations. The objective of cross-selling programs is to increase the number of products and services sold to existing customers of a bank. Today, these sales efforts in the branches are being extended to alternative delivery channels, a major one of which is the phone center. Drawing from experiences of 55 marketers in banking, Wright (1991) identifies a list of common roadblocks between resources and sales in banking. Lack of management focus, poor hiring practices, lack of training, ineffective organization for marketing, poor service, and not knowing customers or products are only a selection of some of these barriers mentioned by the author. The basic motivation of this paper is to identify some of these roadblocks in the context of retail banking phone centers as they move forward with their own sales initiatives. It will be shown that the nature of phone center operations makes them extremely susceptible to the increasing and changing resource needs of a sales organization. In the sequel, a tool will be proposed that helps in identifying and managing some of the major tradeoffs between resources and sales in phone centers.

To provide a more detailed sense of the backdrop that motivated this research, a snapshot of retail banking phone centers is provided in Section 2. The specific questions that are addressed in the research will be posed in this section. This is followed by a brief review of

some related literature. The analytical approach that is used to characterize the tradeoffs between service and sales in phone centers is presented in Section 4. In Section 5, the situation at a specific phone center is described, followed by a numerical analysis in Section 6. Further empirical evidence for the results in Section 6 is provided in Section 7. The paper ends with a discussion of the results as well as future research directions.

2   A Snapshot of Call Centers In Retail Banking

This section presents data obtained from a study of the retail banking industry undertaken by a team of researchers at the Wharton School of the University of Pennsylvania. After a detailed description of the overall study and the data, the discussion will focus on specific data from retail banking phone centers. This data is used to illustrate how the desire to blend service and sales in call centers is being operationalized across this section of the industry. Questions that the current paper strives to address are derived from the analysis of this data (a description of the data collection process can be found in the Appendix).

Responses from the 49 phone centers in the largest bank holding companies in the United States are considered in the numbers that are reported below. Only one of the banks reported having no phone center, while the number of phone centers within the holding company reported by the remaining portion of the banks ranged between one and twenty-five. The bank with no call center at the time the survey was administered commented on an existing pilot to become operational shortly. This clearly supports the claim made by industry experts that call centers have become a major alternative delivery channel to the traditional branch

networks. There is a lot of variation in size between the different call centers. In terms of full-time equivalent employees (FTEs), the average size of the call centers in the sample is 127, ranging from six FTEs to 2000. Average daily call volumes vary between 275 and 650,000.

For accounting purposes, ninety percent of the banks in the sample consider their phone center as a cost center, while ten percent consider it a profit center. Only thirty-nine percent view their phone center as a source of revenue in formal accounting, implying that the majority of banks view their phone centers as a necessary cost. Revenue credits are more frequently given to sales generated at the center than to transactions processed. The data indicates that, on average, sixty-five percent of the total calls at a center are handled by VRUs (voice response units), and thirty-five percent by phone representatives. It is well known that the cost of a call handled by a VRU is much smaller than the unit cost of a call handled by a service representative, which indicates that most phone centers are choosing the lower cost VRU channel.

To assess the way these phone centers evaluate their performance, a list of twelve performance measures were provided, and the respondents were asked to rank the top five measures. Averaging these ranks across the banks, one observes that the time to answer a call, abandonment rates, and sales rank as the top three measures of performance in these phone centers. Thus, even though the traditional customer service measures like time to answer and abandonment rates rank higher in importance, sales is a close third in determining the performance of a center. Focusing on sales activity in these centers, one notes

that, on average, sixty-four percent of full time phone center representatives regularly do sales referrals. Fifty-three percent regularly take in-bound sales-based calls, and seventeen percent perform tele-marketing or outbound sales calls. In other words, on average, more than half of the full time service representatives engage in some sort of sales related activity, confirming the belief that sales activities constitute an important part of work at retail banking call centers. There is some effort to support sales activity with technology. On average, thirty-two percent of the phone centers provide on-line cross-sell support with prompts to phone representatives. In forty-nine percent of the centers, the service representative can access product information and pricing displays on-line, and in seventy-seven percent, the representatives can perform household inquiries (for multiple accounts) on-line.

Looking at this snapshot from the industry's phone centers, one can see the emergence of the following picture. The majority of the call centers are designed for cost efficiency. This is quite natural, given that banking call centers are still mostly viewed as cost centers in formal accounting, and are not given revenue credits for transactions processed or sales generated. Simultaneously, the majority of these call centers are striving to increase sales related activity through their centers. A large portion of service representatives engage in sales activities, however still less than half of the centers provide on-line cross-sell support. The natural question to ask at this point is whether these two goals are compatible. Can one design a call center operation that is low cost, achieves the high service standards desired by most banks, and generates sales revenue at the same time? It is this basic question that is addressed in this paper. The tradeoffs that need to be considered between these somewhat

conflicting goals are characterized and an analytical approach is developed to enable a formal comparison of the costs and benefits of a sales-oriented operation.

A close look at the data indicates that different call centers organize differently. When asked how work is divided up in the center, sixty percent of the call centers responded that all customer service representatives can take all requests, while forty percent indicate some specialization by task or category of call. In the centers that reported service representative specialization, on average, forty-five percent of the specialized agents could perform some tasks outside their specialty, while thirty percent could perform all tasks and twenty-five percent no tasks outside their specialty. Thus, one can differentiate between call centers where service agents specialize or do not specialize. Among those that do specialize, there is a different degree of cross-training, indicated by the percentage of phone center representatives that can handle calls outside their own specialty.

This discussion implies that there are multiple ways of organizing work in call centers, which in turn indicates different responses by the center in order to become sales-driven. In the current paper, several ways of blending service-sales culture in call centers will be analyzed in conjunction with the earlier posed question of whether service and sales are compatible within a call center. The analysis does not attempt to prescribe the right choice of work organization that supports a call center operation blending service and sales. It will, however, be shown that work organization does have an observable impact on the performance of a cross-sell program, and can in some plausible cases make the difference between a program that is a success and one that is not.

3 Literature Review

A strong transition to a marketing orientation in banking is seen as early as the 1970s (Rathmell 1974). As noted in the Introduction, this emphasis on marketing has demonstrated itself through sales programs in branches in the 1980s and 1990s. Bank marketers cited in Wright (1991) emphasize the importance of cross-selling in successful bank marketing, and report on anecdotes of success in cross-selling programs in their institutions. In Richardson (1984), the author provides guidelines and suggestions for successful implementations of sales initiatives. Johnson and Seymour (1985) study a retail bank before and after a cross-selling program has been initiated across its branches. The program is demonstrated to have improved both sales effectiveness and the number of services sold per sale at the bank. The authors further analyze customer perceptions of this conscious sales effort. It is shown that even though customers are, in general, not dissatisfied with the sales activities of tellers, their responses indicate a need for better implementation in terms of making the sales presentations less mechanical.

Similar to the Johnson and Seymour study, the analysis in this paper will focus on identifying some of the effects of increased sales activity on customer service in phone centers. Rather than surveying customer perceptions, the focus herein will be on proposing a methodology that will help to quantify the effects on specific customer service measures identified by call centers. While it is believed that banks can transfer some of their sales knowledge from branches to their call centers, certain characteristics of call center operations indicate some differences which may play a critical role in determining the success of a cross-selling effort.

In particular, it will be demonstrated in the following section that there is a close tie between capacity and customer service quality in a phone center. Given the current desire to design low cost call center operations across the retail banking industry, it is clear that resources will typically be allocated with cost minimization in mind, making congestion-related consequences of sales a major determinant in evaluating success. This observation justifies the need to extend the existing work in the literature on sales programs in branches to the call center environment.

4 Analytical Approach

In this section, the analytical approach that is used to assess the impact of increased sales activity in a traditional service center is described. This approach attempts to explore the issue of compatibility between service and sales, raised in the Introduction and Section 2, when viewed from an operations standpoint. Specifically, consider a call center that is primarily designed for low-cost high-quality customer service. This type of a center will strive to keep customer wait times at a minimum, thereby reducing the number of abandoned calls, while achieving these goals with the least amount of well-trained service representatives as possible. What happens when increasing sales revenue generation becomes part of the mission statement at such a customer service center? Initially, there is a stage when some or all service representatives are trained to become proficient in sales-related activities. Then, cross-selling, or selling more products and services to a retail customer, slowly becomes part of the regular activities at the center. If the phone center personnel is successful in selling

additional products and services over the phone, the bank will begin to experience increases in the revenue generated through its call center. These would not be the only changes, however. A closer look will indicate that simultaneously, one expects average talk times, or the time a service representative spends on the phone with the customer, to increase as more sales related activities are incorporated in a call. Similarly, as sales related calls are forwarded between departments, the effective call volumes experienced in certain parts of the call center will increase. The increase in average talk times and effective call volumes, in turn, will translate into an increase in the congestion at the center, thus, will result in increased wait times and abandoned calls. Management will need to respond with additional staffing and information processing resources to avoid deterioration of service quality at the center. The latter need will be particularly significant, since most existing systems are designed for the capacity needs of a transaction processing center.

This loose description of the transition from service to sales in a call center highlights the presence of multiple tradeoffs. While this type of a transition promises increased revenues, it also indicates additional costs in the form of training expenses, information technology upgrades, and staffing levels that can match the much higher loads experienced in a sales environment. Any choice pertaining to the mix of service and sales activity in the center is contingent on the magnitude of the tradeoffs laid out in the preceding discussion. Using the performance model that is described below, one can quantify the magnitude of these tradeoffs.

4.1 The Performance Model

In Akşin and Harker (1996a), a model for the operations of a phone center is developed, providing a relationship between capacity choice and system performance measures which can then be used to determine the relationship with system revenues. Resources that jointly determine capacity are human resources in the form of service agents, telecommunication resources as phone lines and VRUs (voice response units), and information technology resources.

For a detailed analysis of the model, the reader is referred to Akşin and Harker (1996a). Below, sufficient detail is provided to illustrate how this performance model can be used in evaluating cross-sell programs in a retail banking phone center.

The phone center organized around K departments, each of which specializes in a group of products and services. Customers arrive at the various access channels with an arrival rate of λ_k in channel k, where arrivals in each channel are independent of each other and the arrival process is assumed to be Poisson. Upon arrival, each call needs the presence of an available phone line. There are T_k phone lines in access channel k. If all lines are busy, the customer will receive a busy signal and leave. The calls that receive a busy signal will be labeled as blocked calls in the ensuing analysis. If a phone line is available but all customer service representatives are on the phone with other customers, the caller is put on hold until a service representative becomes available. There are S_k customer service representatives in access channel k. However, those customers that are put on hold do not necessarily wait until an agent becomes available. Some customers may exhibit impatience and leave the

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system while on hold before service initiation; this loss of customers is labeled as reneges. Customers in channel k are assumed to renege according to an exponential distribution with rate α_k.

Upon service initiation, the service representative will need access to the information system. This joint pool of information technology is capable of processing all transactions from different customers simultaneously. This system can be considered as a single server that processes at a constant rate of one service unit per unit time. Notice that during times of high congestion, such central information systems respond with longer processing times. In other words, service times in the system are a function of the total number of customers being served in all channels. This characteristic is modeled as a processor sharing service discipline in the model. Assume that each customer in class k with $k = 1, \ldots, K$ has a service requirement that is exponentially distributed with an average of $1/\mu_k$. That is, upon arrival to the system, each type of call will require a certain amount of processing. Since the speed of the processor is normalized at one, a faster processor will manifest itself as a smaller value for $1/\mu_k$ for the same type of call. The state dependent service rate for class k customers takes the form

$$\mu_k(\mathbf{n}) = \frac{n_k \mu_k}{(n_1 + \ldots + n_K)}, \tag{1}$$

where $\mathbf{n} = (n_1, \ldots, n_K)$ denotes the state vector with n_k being the number of class k customers in the system. Note that the model assumes simultaneous use of the service representative and the information processing resource throughout the duration of the call. While in its basic form, as considered in this paper, it is assumed that the labor content and the com-

puter content of a call are equal to each other, a minor modification of the state dependent service rate allows for the case of call centers where the computer content of a call is less than its labor content. This case is discussed in more detail in Akşin and Harker (1996a).

In order to determine revenue losses that result from congestion in the system, one would be interested in determining the probability of a customer being blocked upon arrival, as well as the loss that occurs due to reneging. Blocking probability in channel k is denoted by $B_k(\mathbf{S}, \mathbf{T}, I)$. Reneges are the second source of customer loss. Denote the long-run probability of renege for a customer of type k by $R_k(\mathbf{S}, \mathbf{T}, I)$.

4.2   A Framework to Evaluate Cross-Sell Alternatives

In the current context, calls that are not lost due to congestion-related effects determine revenues for the center. More specifically, this implies that knowledge of the characteristics of system throughput can be translated into a knowledge of the properties of average system revenues, assuming a given rate of revenue generation per customer call. The specific relationship between call center revenues, resource allocation, and call statistics can be expressed in terms of the performance measures derived earlier.

Using notation from the above section, the throughput in channel k can be written as

$$TH_k = \lambda_k(1 - B_k(\mathbf{S}, \mathbf{T}, I))(1 - R_k(\mathbf{S}, \mathbf{T}, I)).$$

Now, assuming a fixed average revenue rate v_k for calls of type k, total revenues in the system

can be expressed as a weighted sum of throughputs,

$$\sum_{k=1}^{K} v_k \lambda_k (1 - B_k(\mathbf{S}, \mathbf{T}, I))(1 - R_k(\mathbf{S}, \mathbf{T}, I)). \tag{2}$$

It is this relationship that will be used in capturing the costs and benefits of different cross-selling scenarios in the phone center.

4.3   Two Delivery Channel Designs

As banks have moved to a call center paradigm that marries service and sales activities over the phone, different delivery channel designs have emerged, implementing this shift in thinking. A close look at these designs indicates the presence of two extreme models with call centers in between that have a mix of these two designs. To control for the impact of channel design on service and sales performance, the tradeoffs of increased sales will be analyzed in the context of these extreme cases.

The first case is an extension of the current service paradigm. A special sales department is established within the center, which deals with inbound sales calls only. Sales leads are generated in other parts of the phone center, either by all service representatives or by those in some departments. In other words, these service representatives will have the additional duty of trying to determine customers with a potential to buy new products and services, and then to forward their calls to the sales department where the actual sales transaction will take place. This delivery channel design will alternately be called the *specialization* or *sales lead generation* scenario in the following discussion.

The additional time spent with the customer on the phone trying to generate sales leads

will translate into an increase in average talk times. This is equivalent to a decrease in the service rates for the performance model. Sales calls that are forwarded to the sales department will, in turn, affect call traffic experienced by this department. This part of the call center will see an increase in effective call volumes. Both of these changes will have an impact on system throughput, which will then translate into a change in call center revenues. In particular, an increase in average talk times will have a diminishing effect on the throughput of the department generating the leads, by increasing congestion. Call forwarding will increase congestion in the sales department. A look at the throughput expression in (2), however, indicates that it will simultaneously increase throughput in this department, since the potential number of calls handled by this department will increase. The ultimate impact on the sales department will depend on the magnitude of these changes. The impact of any change in a particular department will also be felt by the other departments, since all departments share the same information processing unit, which is expected to slow down under increased congestion. What becomes obvious from this discussion is that disentangling the costs and benefits of the sales and cross-selling activity is not an easy task.

Some call centers may prefer a delivery channel design where all departments within the center are capable of handling both service and sales related calls. This design will be referred to as the *non-specialization* scenario. A specialized sales department may still exist but will only handle occasional calls that cannot be dealt with elsewhere. This design creates much lower call forwarding to the sales department; hence, in most cases, a much smaller specialized sales department will suffice. One would expect all departments involved in the sales effort to

experience some increase in their effective call volumes, the magnitude of which depending on the degree of cross-training in the center. The time service representatives spend on the phone with customers in those parts of the call center, other than the specialized sales department, will increase significantly, since one would expect the mixing of service and sales activities to increase talk times on average. The impact of these changes on system throughput and revenues can be established, following a logic similar to the one for the specialization scenario.

Reflecting on the two scenarios, one notes that in addition to the differences in process, one would expect to see a different group of representatives within each call center. The specialist call center would have a group of people who specialize in service, with some additional training in sales, and a group of pure sales personnel. In the non-specialist center, service representatives would have to be extensively trained in sales and be able to excel in both dimensions. These types of training costs need to be incorporated in a comparison of the two scenarios discussed. Differences in organizational culture and personal capabilities at these two types of call centers are not captured in the analysis of this paper, but constitute a major factor in sales program choice and implementation.

It is possible that for both scenarios, a change occurs in the average revenue generated per call as a result of cross-selling. The magnitude of this change would depend on the revenues generated per successful sales call divided by the total call volume, where call volume includes the internally transferred calls as well. Both anecdotal evidence from the field, and data from the retail banking study described in Section 2 indicate that revenue data is difficult

to obtain, and only a few banks can actually estimate average revenue generated per call. This type of data will probably become more available as phone centers push forward with their increased sales agenda. For the current analysis, it is assumed that revenues per call remain the same before and after the sales effort. In other words, the differences in revenue between the various scenarios is only due to the differences in the volume of calls handled in each case. All results should be interpreted in the presence of this assumption.

In the analysis that compares the two scenarios, a distinction will be made between a case that assumes no restaffing action taken by management as a response to the load increases created by sales related activities, and a second case which looks at the impact of sales given a restaffed center. Ideally, this type of a comparison for the latter mentioned case would be made for a center that has been restaffed optimally. For the current analysis, a heuristic restaffing action is considered. This analysis is only meant to illustrate that taking the right staffing action can make a difference on the end result of a sales initiative. To formally quantify the impact of sales on center revenues, one would have to compare optimally staffed centers. This is the objective of ongoing research.

The analysis in this paper looks at the capacity implications of sales only. The methodology is being proposed as a preliminary what if type tool, which will enable management to foresee some of the more tangible and quantifiable aspects of increased sales activity in a call center. Other issues that constitute the sales versus service dilemma for banks, especially in human resource related issues, should be incorporated in any real evaluation endeavor.

5   Situation at a Major Phone Center

In this section, the situation at one phone center of a major U.S. retail bank is reported, based on data that was provided by this center. The phone center is the largest of four centers at the bank. Expressed in different variables, its size is approximately 200 FTEs, call volumes of around six million calls a year, two hundred 800-trunks (phone lines) that are shared among six specialized departments, and approximately 150 VRU trunks in three separate VRU channels. In terms of the performance model described earlier, this means that there are nine access channels, six of which share their phone lines. Sharing 800-trunks translates into a change in the state space, and is easily incorporated in the earlier analysis. The other three access channels are VRU channels, which means that these channels provide automated service. In these channels, reneging or call abandonment can happen during service, since service occurs on the phone line. This difference can again be easily incorporated in the analysis of the performance model.

One of the specialized access channels in the call center is a sales department. This department specializes in sales, and handles all inbound sales calls for products and services that are sold over the phone by the bank. The remaining five departments focus on service calls, and forward any sales requests by the customer to the sales department. As of October 1995, the center did not have an aggressive cross-selling initiative under way. While management reports some cross-training of service representatives and optional training programs in cross-selling, a formal cross-selling program was not instituted at the time. Service representatives are encouraged to cross-sell whenever they can; however, they are not incented

on the number of sales leads they generate in any way. On-line technological support for cross-selling is currently unavailable. This picture indicates that the center has not embarked on an aggressive cross-selling effort as described earlier in this paper; however, there are some activities that indicate a desire to move in this direction. Informal conversation with management supports this observation.

Data availability to estimate parameters for the performance model are described next. Recall that model parameters of interest are the call arrival rates λ_k, required service time rates μ_k, and abandonment rates α_k, with $k = 1, 2, \ldots, K$. Given these parameters and data on the phone center configuration in terms of service representatives staffed in each channel and the number of phone lines, the model generates performance measures such as blocking probabilities and reneging probabilities in each channel. Looking at blocked calls and abandoned calls experienced at the center at the time of study, one notes that overall, the center experiences very low call loss. In particular, the center reports no blocked calls, which implies that blocking probabilities are zero in terms of the earlier terminology. Renege probabilities, or abandonment rates as they are called in the center, are between zero and two percent throughout the center as tabulated in Table 1. While these numbers vary between channels, data from 1994 indicates that these numbers mostly cluster around one percent abandoned calls.

For the most part, the data available to the authors consists of monthly and yearly averages for call volumes, talk times, and abandonment rates. This level of detail does not allow for a precise estimation of model parameters. To this end, detailed data for one day

Table 1: September 1994 average abandonment rates experienced in the call center

Department	1	2	3	4	5	6	7	8	9
percent abandoned	2.35	0.34	1.57	0.53	0.00	1.16	0.11	0.45	0.69

was obtained. This data included the number of calls, the total number of calls abandoned, the average abandonment time, the average talk time, and the number of positions staffed per thirty minute interval throughout that day. This data was available for all departments except the VRU channels. It is clear that estimates obtained by considering only one day of operation will yield a very crude idea of model parameters. Any missing data at the thirty minute interval level is replaced by equivalent monthly or yearly average figures which further distort the quality of the estimates. These estimates are only presented to give the reader a feel for the example.

A one day sample data for a day in September 1994 is used to estimate abandonment rates, based on the average abandonment times in each department. Since this half hour data is not available for VRU calls, the abandonment rates for these channels are assumed to resemble those in other parts of the center. The arrival rates, λ_k, are estimated using the average total number of calls for a peak half hour interval on this day. Since this particular day in September does not necessarily reflect the yearly peak for this center, the arrival rates are further multiplied by a constant of 1.5. The latter constant was determined arbitrarily. Given average talk times and the average number of calls in each channel (as an estimate

Table 2: Model parameters for the base case

Department	min./day	λ (calls/min.)	μ (calls/min)	α	Positions staffed
1	43200	4.35	0.48	5.46	23
2	29700	1.5	2.8	0.75	6
3	28800	0.495	18.0	5.0	2
4	19800	0.9	8.0	3.33	3
5	11400	0.3	28.0	2.86	3
6	17100	0.375	6.0	2.5	5
7 (VRU)	43200	9.0	0.75	6.0	132 (trunks)
8 (VRU)	43200	0.3	30.0	6.0	12 (trunks)
9 (VRU)	43200	0.75	30.0	6.0	7 (trunks)

of n_ks), one can obtain an estimate for the μ_k's from this one day data. Each department's working hours are converted to total minutes per day. All of these parameters are shown in Table 2.

Looking at the average positions staffed in each half hour interval, staffing levels matching the parameters estimated were obtained. The number of trunks were taken directly from the data. The snapshot of the center thus obtained was analyzed using the performance model. All results reported are based on five-hundred-thousand iterations of the Monte Carlo summation method as described in Akşin and Harker (1997). Blocking probabilities

generated by the model are zero in all departments, indicating a match with the experience at the center of having no blocked calls. Similarly, abandonment rates generated by the model are within the zero to two percent range observed at the center. This analysis is not presented as a model validation, or an exact representation of the center. However, it will be argued that in many ways it is close enough to the actual situation at the center so that it can be viewed as a realistic example from one phone center operation.

6   Establishing the Service versus Sales Tradeoffs in the Phone Center

What would happen if management decided to initiate a cross-selling effort in the center? An example is presented that illustrates use of the proposed analytical approach in assessing some of the impacts of such a move. The purpose of this analysis is not to derive a prescription for the center under study. This type of a prescriptive study would require a formal model validation stage, followed by a phase of close collaboration with management in evaluating all relevant what if type questions extensively. The example in this section would only constitute one such speculative question. In addition to demonstrating how the model may be used to aid decision making at the managerial level, the objective of the analysis will be to draw some generalizable conclusions for phone centers in retail banking embarking on new sales initiatives. In particular, it will be shown that cross-selling could deteriorate both service and profit performance of a call center if it is not implemented in the right way and

Table 3: The two cross-sell scenarios

	Average talk times	Effective call volumes
Scenario 1	10% increase in Depts. 1,3,4	20% increase in Dept. 2
Scenario 2	20% increase in Dept. 1,3, 4	5% increase in Depts. 1,2,3,4

at the right level.

The data discussed in the previous section provides a base case for the situation at a phone center before embarking on a sales effort. The situation that emerges after a conscious sales effort is analyzed in the context of the two delivery channel designs described earlier. For the example under study, these two scenarios take the following form. The sales lead generation scenario, or Scenario 1, has Departments 1, 3, and 4 generating sales for the sales department, which is Department 2. The non-specialization scenario, or Scenario 2, has Departments 1, 3, and 4 adding sales to their regular servicing activities. Given the current functionality of Departments 1, 2, 3, and 4 at the call center, their involvement in a sales program appears to be a realistic scenario. As pointed out in Section 4.3, the impact of increased sales activity on the call center's operations will be captured through changes in effective call volumes and average talk times. The magnitude of these increases are shown in Table 3. These magnitudes are arbitrary, and different magnitudes could easily be tested using the proposed methodology. Determining appropriate magnitudes would constitute a significant part of implementing this methodology.

Percent abandonment or renege probabilities for the base case and Scenarios 1 and 2

Table 4: Percent abandonment rates and associated confidence intervals in the call center

Dept.	Base	Scenario 1	Scenario 2	Restaff 2	Restaff 22
1	0.57 (-0.24,1.38)	0.25 (-0.26,0.75)	1.36 (-0.46,3.16)	2.14 (-3.15,7.43)	0.02 (-0.04,0.08)
2	0.9×10^{-7} $(0,0)^\star$	0.1×10^{-5} $(0,0)^\star$	0.003 (-0.003,0.01)	0.0 (0,0)	0.0 (0,0)
3	0.28 (-0.45,1.19)	0.001 (-0.002,0.004)	0.2×10^{-4} $(0,0)^\star$	0.001 (-0.002,0.004)	0.0 (0,0)
4	0.0 (0,0)	0.0 (0,0)	0.0004 $(0,0)^\star$	0.1×10^{-7} $(0,0)^\star$	0.0 (0,0)
5	0.0 (0,0)	0.0 (0,0)	0.0 (0,0)	0.0 (0,0)	0.0 (0,0)
6	0.0 (0,0)	0.0 (0,0)	0.0 (0,0)	0.0 (0,0)	0.0 (0,0)
7	0.56 (-0.17,1.30)	0.09 (-0.08,0.26)	1.11 (-0.37,2.58)	0.08 (-0.08,0.24)	0.006 (-0.01,0.02)
8	0.1×10^{-5} $(0,0)^\star$	0.1×10^{-5} $(0,0)^\star$	0.01 (-0.01,0.03)	0.3×10^{-7} $(0,0)^\star$	0.2×10^{-7} $(0,0)^\star$
9	0.0004 $(0,0)^\star$	0.9×10^{-4} $(0,0)^\star$	0.01 (-0.01,0.03)	0.6×10^{-4} $(0,0)^\star$	0.004 (-0.01,0.02)

are shown in Table 4 along with 95 % confidence intervals. The first number in each cell denotes the point estimate for abandonment probabilities (the midpoint of the confidence interval) and has been added for easier readability. All intervals where the lower and upper limits are less than 10^{-3} have been denoted as $(0,0)^\star$ for compactness. Blocking probabilities remain zero throughout and thus, are not tabulated. It is not surprising to observe that the sales activity can deteriorate the customer service measure that captures the percentage of abandoned calls. Recall that both scenarios assume management does nothing to react to this additional capacity utilization once the sales program is initiated. In the fourth and fifth column of Table 4, percent abandonment rates are reevaluated for Scenario 2, where the center has been restaffed. Looking at the high abandonment rates in Department 1 after the sales effort, one customer service representatives was added to this department in Scenario 2, labeled as Restaff 2 in Table 4. The case where seven customer service representatives were

added to Department 1, again for Scenario 2, is tabulated in the column labeled Restaff 22. No claims are made about the optimality of either restaffing choice. Comparing Restaff 2 and Restaff 22, it is clear that from an abandonment rate perspective adding more representatives to Department 1 is desirable.

An analysis of the abandonment rates in Table 4 has shown that the impact of sales activity on service quality in the center varies by department, and that while some experience deteriorating rates, others exhibit improvements. In an earlier discussion, it was stated that the increase in the effective call volumes of certain departments increases their revenue generation potential, since the number of calls offered to these departments increases. To capture this benefit of cross-selling and to see how it trades off with the service quality deterioration, the five scenarios in Table 4 are compared based on total system profits. Some clarification on the assumptions made for this analysis is in order. First, it is assumed that, on average, every call in the center generates a revenue of $ 1. This number was picked arbitrarily due to the lack of revenue data at the call center. All costs for the Base Case and Scenarios 1 and 2 are taken to be identical. More information on differences in cross-training would indicate a difference in personnel costs between the two scenarios. For simplicity in the current analysis, it is assumed that these costs are the same. The profits are evaluated by incorporating the monthly wages of the service representatives in each scenario, based on a $ 17,000 average annual salary. This represents the salary of level one customer service representatives (lowest level out of four levels) in the center under study.

One month's profits for the center under these assumptions for the various scenarios

are shown in Figure 1. With no restaffing action, Scenario 1 performs slightly better than Scenario 2 from a profit standpoint. What is interesting to note about the cases with restaffing for Scenario 2 (last two columns) is that the additional revenue potential of extra capacity in terms of staff is quickly diminished by the cost dimension of additional staff. Thus, a slight increase in profit is observed for Restaff 2. However, this increase is quickly overtaken by the increase in costs for all additional service representatives in Department 1. Restaff 22 illustrates this case, where additional service representatives (beyond the seven that were already added) no longer impact revenues since abandonment rates have decreased significantly. Thus, it seems that even compared to the restaffed versions of Scenario 2, Scenario 1 is better in this instance.
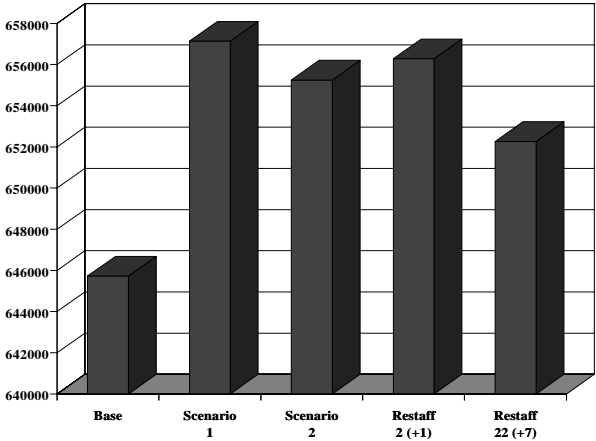

Figure 1: Call center profits under various cross-sell scenarios

It is difficult to draw any generalizable conclusions about the choice between the sales

Table 5: Model parameters for the second base case

Department	min./day	λ (calls/min.)	μ (calls/min)	α	Positions staffed
1	43200	3.56	0.109	5.46	43
2	29700	0.27	0.001	0.75	11
3	28800	0.08	0.300	5.0	2
4	19800	0.20	0.080	3.33	3
5	11400	0.07	0.052	2.86	3
6	17100	0.05	0.017	2.5	5
7 (VRU)	43200	0.306	0.75	6.0	132 (trunks)
8 (VRU)	43200	0.037	30.0	6.0	12 (trunks)
9 (VRU)	43200	0.068	30.0	6.0	7 (trunks)

lead generation and non-specialization delivery channel designs. Extensive analysis as the one in the above example for different levels of change in the model parameters need to be performed. To illustrate this point, a second example with different arrival and service rate parameters and appropriately modified staffing levels is provided. The parameters for this example were arbitrarily determined. The idea is to illustrate how the same analysis for a similar center with different inital capacity utilization can lead to a different result. The parameters for this second example are tabulated in Table 5.

In this second example, the center experiences higher initial congestion levels, as demon-

Table 6: Percent abandonment rates and associated confidence intervals: the second base case

Dept.	Base	Scenario 1	Scenario 2	Restaff 1	Restaff 2
1	0.71 (-1.02,2.44)	0.91 (-1.04,2.86)	0.97 (-1.00,2.97)	0.024 (-0.01,0.06)	0.53 (-0.69,1.74)
2	3.01 (2.81,3.22)	3.03 (2.86,3.19)	0.27 (-0.26,0.79)	1.58 (-0.47,3.64)	0.15 (-0.19,0.50)
3	0.0003 $(0,0)^\star$	0.0005 $(0,0)^\star$	0.001 (-0.001,0.002)	0.001 (-0.002,0.005)	0.0002 $(0,0)^\star$
4	0.28 (-0.44,0.99)	0.01 (-0.02,0.04)	0.01 (-0.01,0.04)	0.6×10^{-4} $(0,0)^\star$	0.02 (-0.02,0.05)
5	0.0 (0,0)	0.1×10^{-7} $(0,0)^\star$	0.0 (0,0)	0.0 (0,0)	0.0 (0,0)
6	0.20 (-0.33,0.74)	0.15 (-0.26,0.56)	0.16 (-0.25,0.58)	0.002 (-0.002,0.006)	0.17 (-0.29,0.63)
7	0.02 (-0.02,0.06)	0.03 (-0.03,0.08)	1.65 (-1.58,4.88)	0.004 (-0.004,0.012)	0.43 (-0.69,1.54)
8	0.2×10^{-5} $(0,0)^\star$	0.0002 $(0,0)^\star$	0.0001 $(0,0)^\star$	0.1×10^{-7} $(0,0)^\star$	0.9×10^{-4} $(0,0)^\star$
9	0.2×10^{-5} $(0,0)^\star$	0.8×10^{-4} $(0,0)^\star$	0.8×10^{-4} $(0,0)^\star$	0.6×10^{-6} $(0,0)^\star$	0.1×10^{-5} $(0,0)^\star$

strated by the higher abandonment rates for the new base case tabulated in Table 6. Using the same changes in average talk times and effective call volumes as a result of cross-selling, tabulated in Table 3, the new abandonment rates for Scenario 1 and 2 are obtained. In the fourth and fifth columns of Table 6, percent abandonment rates are reevaluated for Scenario 1 and 2, where for both scenarios, the center has been restaffed. Confidence intervals are tabulated next to the point estimates as in the previous example.

Observing the higher abandonment rates in Department 1 after the sales effort, five customer service representatives were added to this department in Scenario 1 and three representatives were added to this department in Scenario 2. Department 2 in Scenario 1 was also restaffed with one additional person. The impact of the shared processor can be seen by comparing each scenario with its restaffed version. While the additional service

representatives in Channel 1 decrease renege probabilities in this channel substantially in both scenarios, the performance deteriorates in some of the other channels. Based on this observation, one can argue that due to the shared nature of the information processing resource, overstaffing a certain department will allow more calls of this type to be processed simultaneously, with potential adverse effects in other parts of the call center.

A profit analysis of the new base case yields the situation in Figure 2. While the first base case resulted in the sales lead generating design outperforming the generalist design, the new base case leads to the opposite result. In particular, it can be observed that the generalist design leads to higher profits with fewer additional customer service representatives (three versus six) in the restaffed scenarios. Many different restaffing schemes were tested for Scenario 1, all leading to lower profits than the case when no restaffing was performed. The restaffing scheme reported in this example was kept because it is instructive. It emphasizes the point that non-optimal restaffing could be worse than no restaffing action at all. The restaffed configurations of the center emphasize the point that taking the right staffing action once the center is transformed from a primarily service orientation to a service and sales organization can be critical in determining the success of a sales program.

The example illustrates a case where the sales department is not prepared to deal with the increase in sales referrals experienced in the specialization scenario. This implies that the cross-selling effort in the other departments that try to generate sales leads are wasted without obtaining the desired increase in sales, only creating additional detrimental congestion for the center. The generalist scenario outperforms the specialist work organization in this

instance because it is able to spread the additional load created by referrals across multiple departments, and despite the fact that average talk times increase more. The model enables the quantification of these types of complex tradeoffs.
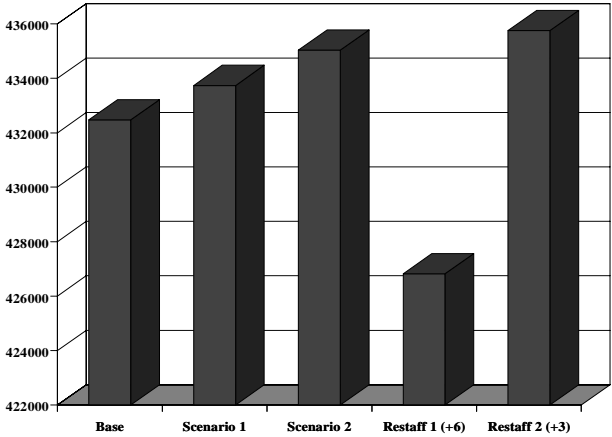

Figure 2: Profits for second base case

A comparison of the two examples leads to the conclusion that the negative impact of cross-selling can be overcome by moving to a new work organization in some instances. This comparison further allows one to draw the following conclusion. Note that the difference between the profits for the base case and the two scenarios in the second example is much smaller than those in the first example. One can easily envision a third example where initial congestion levels are such that, an introduction of sales activity could lead to lower profits in the two sales scenarios when compared to the base case with no formal sales program in effect. In other words, it is possible that the costs of cross-selling can exceed its benefits

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under an increased sales activity scenario where no restaffing action is taken. This decrease in profits could be observed, even though the additional costs of implementing a cross-selling program like training costs and technology costs are not incorporated in the analysis.

This discussion clearly demonstrates that if no action is taken, increased sales activity can simultaneously deteriorate customer service measures and decrease profits at a call center. Delivery channel design, and the magnitude of the changes on average talk times and effective call volumes, both play a role in determining this *congestion cost*, indicating the need to design and implement sales programs appropriately. The comparison of the two examples leads to an important conclusion. *Different call centers can succeed in cross-selling by adopting different work organizations.* In other words, not only is the congestion cost associated with cross-selling a function of the work organization, but also a function of call characteristics. The same sales program implemented in another center with different call characteristics (different call volumes and call lengths in this instance) leads to a different choice in terms of work organization. In the preceding analysis, delivery channel designs are compared from a capacity perspective. As noted earlier in Section 3, other issues need to be considered in determining the ideal design.

The need for a tool that can determine profit maximizing staffing levels in call centers is apparent from the preceding analysis. The analytical approach in this paper can be used to compare and analyze different sales scenarios. The authors are currently working on extending this analysis to identify the proper restaffing choice under each sales scenario (Akşin and Harker 1996b).

7 Empirical Verification of Sales / Service Tradeoff

In a forum held at the Wharton School in February 1996, results from this paper were presented to a group of phone center managers from all segments of the financial services industry. Motivated by the results that work organization matters and that cross-selling is not necessarily profit enhancing if it is not implemented properly, a major retail bank performed a study of their own cross-sell program after the forum. Even though their analysis did not use the model described herein, their results confirmed the major qualitative result of this paper; namely, that work organization matters. In this case, the bank found that a work organization where each department has its own sales agents and a small sales department that only deals with occasional cases (the non-specialization scenario) is superior to one where service representatives try to generate leads which they then forward to a sales department (the specialized scenario). The existing sales paradigm at the bank, at the time of this study, was the specialized work organization. Based on their results, this bank's call centers are now restructuring. A new information system accompanying this restructuring is being built.

A close scrutiny of cross-selling further demonstrated to management that one could make a distinction between types of sales transactions. In particular, it was observed that certain sales transactions that are counted as revenue enhancers in the current system were actually diminishing revenue potential for the bank, while others induced the customer to deepen their relationship with the bank even further. An example of the former type could be overdraft protection in a checking account, resulting in foregone penalty fee earnings for the

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bank. The new system is designed to prompt agents for profitable sales opportunities. This is an additional insight obtained by the bank's study. It indicates that an analysis similar to the one performed in this paper raises awareness, resulting in a deeper understanding of certain phenomena, well beyond the capabilities of the model itself. In future work, the revenue dimension of different sales efforts will be investigated, to capture the difference between sales attempts that are a success and those that are not.

It is instructive to briefly focus on the details of this bank's study and how it was performed. Using data available for the current operation and some projections for the case with the different work organization, the study estimated costs and revenues generated by each cross-sell scenario. On the cost side, these estimates account for differences in training expenses, additional telecommunication expenses incurred due to increased talk times, additional representative space due to differences in staffing requirements (estimated using current staffing policies), additional representative personnel expenses, again due to differences in staffing, and additional allocation expenses. Thus, it is clear that the results reported in this paper underestimate the cost dimension of cross-selling, since only staffing costs were incorporated in the current analysis. The differences in profits reported earlier would be more dramatic if these additional costs were included. On the revenue side, the bank's study accounts for differences in the percentage of leads that are successfully converted to sales in each of the two work organizations. This could be a source for another difference with the analysis performed herein, since the framework in this study does not account for differences in leads-to-sales conversion percentages. Once again, incorporating these could dramatically

increase the difference in the revenue potential between the two work organizations.

8   Conclusions and Directions for Future Research

The preceding analysis uses a plausible example from a retail banking phone center to demonstrate that cross-selling is a costly endeavor. In addition to its visible costs like training and technology costs, cross-selling is shown to have detrimental effects on customer service due to the additional load it creates on the system. With a move to more selling, capacity needs will increase both in terms of customer service representatives and in terms of information processing resources. One should note that the capacity implications of cross-selling programs can be easily overlooked, since these are less visible than what one expects to see on the revenue side. The analytical approach suggested in this paper is capable of quantifying the capacity implications of cross-selling, and in this sense constitutes an important tool to aid decision making.

The above examples show that by restaffing, the center can overcome some of its congestion related problems induced by additional sales activity. A need to determine the appropriate staffing levels, after such an increase in call traffic has been experienced, is apparent from this discussion. The restaffing problem constitutes a natural next step for this research. The authors are currently working on using the performance model outlined herein in conjunction with an optimization model to determine economically optimal staffing levels for call centers (Akşin and Harker 1996b).

While restaffing does alleviate congestion related problems at a center experiencing a

transition to more sales activity, the contrast between the two sales scenarios that were analyzed suggests that staffing is not the only factor that needs to be considered. Designing the right process and adopting human resource practices that support this design are equally important in determining the success of a cross-sell program. The examples, as well as the independent study performed by the bank reported in Section 7, emphasize the claim that adoption of the proper work organization to support cross-selling activities in retail banking phone centers constitutes a critical success factor.[1]

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To Sell or Not To Sell:

Determining the Tradeoffs Between Service and Sales in Retail Banking Phone Centers

APPENDIX

The retail banking study is an interdisciplinary research effort aimed at understanding the drivers of competitiveness in the industry, where competitiveness means not simply firm performance but the relationship between industry trends and the experiences of the retail banking labor force. Following an initial exploratory phase consisting of open-ended and structured interviews with industry informants, the second phase of the study was launched, entailing a detailed survey of technology, work practices, organizational strategy, and performance in 135 U.S. retail banks. The team sought to survey a group of banks that could yield the broadest coverage of the trends in human resources, technology, and competitiveness in the industry. The survey was not intended as a random sample of all U.S. banks; rather, the focus was on the largest banks in the country. In the end, the approach gained the participation of banks holding over 75% of the total assets in the industry in 1994. A list of the 400 largest bank holding companies (BHCs) in America at the beginning of 1994 was compiled. Merger activity, and the fact that a number of BHCs had no retail banking organization (defined as an entity that provides financial services to individual consumers), reduced the possible sample to 335 BHCs.

Participation in the study required substantial time and effort on the part of organizations. Commitment to participation was sought, and the 70 largest BHCs were approached

directly. 47 BHCs agreed to participate with at least one retail banking entity. Seven of these BHCs engaged the participation of two or more retail banks, giving a total of 64 participating retail banks in the sample. Multiple questionnaires were delivered to each organization in the sample. For this group of banks, questionnaires were delivered to four top managers: the head of the retail bank, the top finance officer, the top marketing officer, and the top manager responsible for technology and information systems. These banks received questionnaires for one manager of a bank telephone center, one for a branch manager, and one customer service representative (CSR) in the bank's "head office" branch, defined as the branch closest to the bank's headquarters. In addition, a researcher on-site in this branch gathered data about business process flows for checking and small business loans. Identical questionnaires were mailed to five more branch managers, and to CSRs in those branches. In these questionnaires, the CSRs themselves mapped processes associated with home equity loans, checking accounts, certificates of deposit, mutual fund accounts, and small business loans.

In late 1994, surveys were mailed to the next largest 265 BHCs followed with a telephone call. Sixty-four of these BHCs agreed to participate in the study, with four of these engaging the participation of two or more retail banks in the BHCs, so that a total of 71 participating retail banks constituted the sample of the mailed survey. For this group of banks, the head of the retail bank was surveyed. Many of the questions directed to other top managers were consolidated into this survey. For this sample, questionnaires were also mailed to one telephone center manager, one branch manager and one CSR in the head office branch.