# Some Observations on Analytical Marketing in Banking Research and Practice*

By Leonard S. Simon, Rochester, N. Y.

The structure of banking in most industrialized countries has been changing far more rapidly in the past several years than at any time previously. Many attribute this to improvements in technology such as electronic funds transfer systems (EFTS), governmental policies, or the more complete fungibility of world currencies. These are, of course, factors in producing a transition to a new kind of banking. But more important than all the previous is the adoption by banks of the philosophy of aggressively merchandising their services.

Marketing, at least passively, has always existed in any banking situation. It is impossible not to undertake a number of the acts associated with influencing the public, the householder, the merchant, or the executive to utilize an institution's services. However, it is the relatively recent formalization and employment of sophisticated techniques previously utilized by such respected international marketers as Unilever, Proctor and Gamble, Volkswagen and others that has made the present difference in bank marketing.

The purpose of this paper is to provide some perspective on this new type of marketing thinking, namely in the area of management science/operations research, which is very likely to affect strongly decision-making in banking institutions. It is the ability to obtain and disburse funds into profitable investments during periods of both monetary ease and tightness that plays the penultimate role in the bank's success. Funds procurement is usually thought of as the principal focus of the marketing job, but influencing the character of the clientele seeking loans is equally important. The following sections highlight how thinking about both these tasks is changing.

* The author wishes to thank Professor George *Benston* for his patient review and valuable comment upon earlier drafts of this manuscript.

## I. How the Emphasis on Marketing Came About

The basic structure of the banking industry throughout most of the world is quite similar. Market prices (interest paid and received) are generally the result of the competitive rivalry among a few large banks, subject to several constraints. One constraint is formal or informal cartel agreements among the banks. Another is government intervention to "bring order" to the industry or achieve monetary policy goals. With price competition constrained, bankers compete with non-price inducements (which seem to be becoming more and more artful). However, often these too are regulated by cartels or government when they are identified[1]. Thus, banks must continually find new methods of competing for customers, a need which has been important in bringing marketing to the fore in banking operations.

Removal of regulatory constraints can also be an impetus to development of scientific marketing capabilities. In Germany interest rate regulation induced new forms of non-price competition. But, because of the large margin between deposit and loaning rates as prescribed by the authorities, bankers paid insufficient attention to the high costs of non-price competition. After interest rate regulation was removed and margins became very narrow, the pressure to obtain lower costs brought forth much activity in the nature of analytical marketing.

A second factor accounting for the increasing emphasis on marketing has to do with recognizing that the demand for banking services is highly segmented. Large corporations, who have been the principal mainstay of commercial bank activities throughout the world have become increasingly sophisticated in their utilization of funds. At one time many corporate treasurers relied principally upon their bankers to invest temporary excess funds and to provide funds for operations. Now, one often finds the same corporate treasurers dabbling in currency speculation and Euro-dollars, issuing commercial paper and

[1] An excellent illustration of the elimination of non-price competition occurred in the State of New York in which thrift institutions were vigorously competing for time deposits through the offering of premiums in the form of appliances and other valuable items; this situation was a naturally resulting form of non-price competition since the firms were all paying the maximum interest rate permitted by federal regulation. As this type of competition intensified, bankers began calling for its elimination based on the "facts" that it was demeaning to the public, undignified, and did nothing more than switch funds from one institution to another. The regulatory agency complied.

handling funds in about the identical fashion previously done for them by bank managers. At the same time, needs in the household and individual sectors have become more sophisticated. In addition to checking and savings accounts, mortgage loans and installment loans, in most industrialized nations consumers use credit cards, lines of credit, negotiated certificates of deposit, foreign drafts and the like. In such circumstances, it is only natural for banks to shift their attention from the segments where generic demand is declining to those where it is growing and concomittantly to begin to use and innovate new marketing techniques for exploiting the latent demand in each segment.

A third factor bringing marketing to the fore is the current emphasis on consumerism. Procedures and actions that were previously accepted at face value now must be explained and justified. Consumers now want to know exactly how the rates of return on their invested or borrowed funds are calculated. Frequent advertising and exposure of the consumer to alternative competitive offers has sensitized him to the value of evaluating bank services.

A fourth factor is that competition in some countries is being experienced from sectors that are outside what has been traditionally defined as the banking industry. In the United States, for example, small loan corporations which lend money to somewhat higher risk consumers at higher interest rates have not normally been thought of as members of the financial industry. Several of these companies now have been purchased by a number of major U. S. commercial banks tending to bring this type of activity within the general fold of banking. Another special purpose institution, credit unions, who use an individual's membership in some group as a basis for providing small loans at low interest rates, most likely will have their powers broadened to compete in new markets. Similarly, proposals to give thrift institutions powers corresponding to those of commercial banks as far as the household sector is concerned also introduce greater uncertainty about the structure of the banking industry. The same kind of phenomena are occuring in other countries too; witness, for example, the increasing role in Germany of negotiators who transmit credits from the creditor to the borrower.

The foregoing trends and factors have accelerated the infusion into the financial industry of people whose background and training in marketing has produced success in other industries. These individuals have

come from such diverse organizations as prepared food manufacturers and soap companies[2]. It is only natural, therefore, that they apply the techniques they have developed for handling marketing questions in other environments to banking. Thus, the changes in the market place mentioned earlier combine with the "new" ideas of the new personnel to produce innovations in bank marketing.

## II. Illustration of the Interaction of Changing Operations Technology and the Necessity for greater Emphasis on Marketing

One of the key factors which will continue to dominate bank developments in the next decade is "convenience". It has long been known that the consumer is willing to trade off higher interest for convenience[3]. Such activities as banking by mail or over the telephone have been designed to increase the consumer's convenience. In the United States, there is currently a tremendous expansion of the number of branch offices of the various banking institutions; the trend is toward larger numbers of smaller branches as now exists in many European situations. Other evidence of the trend to somewhat more limited and more numerous service facilities in the United States can be found in the Federal home Loan Bank's authorization of satellite offices which do not have to be a complete, self-contained banking unit but may consist of nothing more than a few teller counters with suitable equipment in, say, a supermarket[4].

The trend towards greater numbers of branches may also be seen in commercial bank's diversity. A number of the large commercial banks in the United States have purchased business that were previously considered competitors such as consumer finance (small loans) and mortgage banking companies. In a technical sense, every one of the offices of the acquired organizations has the potential for ultimately becoming an office of the parent bank holding company. The offices of the acquired organizations increase general consumer awareness well before

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[2] As an aside, it might be noted that technologists and specialists are coming to the fore in banking and if not replacing than certainly working on an equal level with the key financial decision makers.

[3] See, for example, George K. *Kardouche,* The Competition for Savings (New York: The Conference Board, 1969), and studies reviewed therein.

[4] Recently, fifteen competing thrift institutions in the State of Washington began operating a single, 24-hour, remote service facility which could be used by any of their customers for a limited set of transactions.

the parent bank can offer a full set of services and provide an initial list of prospects who can be cross-sold each new service at appropriate times.

The acquired consumer finance and mortgage companies provide commercial banks with the possibility of nation-wide banking, which at present is not legal in the United States. Unlike their new parents, these acquired organizations may operate in more than one state. Should the proposals put forth by several state bank supervisors to permit banks to operate in more than one state with privileges granted reciprocally become a reality, banks with consumer finance and mortgage company subsidiaries will be in a good position; the offices of the subsidiaries can be connected to branch offices of the parent relatively easily.

Similar trends, in this case continental rather than national, appear to be occuring in Europe. Development of the Euro-Check system and the corresponding identification cards are recognition of the consumer desire for increased convenience even across national boundaries. This is a first step in interlocking and interweaving into a unified system what were heretofore much more independent entities to serve consumers' banking needs.

Consumers convenience is also a key factor in the development of national and international electronic funds systems (EFTS). EFTS is often considered simply a technological advance that reduces the cost to banks of processing transactions. All too often, bankers concentrate almost entirely on EFTS's technological problems and implicitly assume that consumers will be as intrigued by the technological aspects as they are. However, experience indicates that marked departures from the traditional ways in which people have been accustomed to banking often have not been accepted. Initial experiments in the United States which regard to EFTS concentrated on the mechanistic functions of bank clearing as opposed to the fashion in which the consumers might wish to participate in EFTS. As a result, only a limited number of the early experiments have been successful in market place terms[5]. Many times, scant attention is paid to consumer requirements. In Germany, for example, it is reported that the Euro-Checks prepared for EFTS are very sensitive, so the banks gave customers a big, hard cover to protect the

[5] This is not the place to describe the array of experiments. Good summaries may be found in special reports repared by the various bankers' associations in most of the industrialized countries.

checks, making it almost impossible to put the checks into one's pocket. It seems that consumers do value convenience and service rather than machinery, and they do not automatically see how EFTS is an improvement.

What all this means is that as bankers change their methods of operation to shift to a "paperless" society there is going to be an increasing need for the marketing function to educate people to a new system. In fact, the relative success of institutions which adopt the new technology depends on their ability to think through the marketing aspects of EFTS. The greatest gain does not necessarily always go to the innovator of a new banking method. Rather, it may pay to hold back somewhat and closely observe EFTS developments. Severe costs were incurred by those who were earliest into the credit card business in the United States, including some very large banks who were forced to withdraw to cut losses which exceeded reasonable levels of investment in market development. The shift to EFTS is likely to produce similar phenomena.

## III. Sophisticated Tools for Marketing

In the face of such great change, the banker has to bring to bear the most sophisticated techniques he can find. Obviously, use of such techniques will depend partially upon the size of the institution and its ability to support research efforts in the marketing realm. What follows is a presentation of some basic analytical ideas applied to several of the fields in which bankers compete vigorously[6]. The discussion is not intended to be comprehensive with regard to innovations in bank marketing, and the techniques are not necessarily new. They are presented here, not with a view to immediate adoption and application, but rather to stimulate the thinking of bankers who must cope with the problems of securing and subsequently investing their banks' flow of funds.

### 1. Bidding for Deposits

Bankers seem to have accepted as their goal in the consumer realm the creation a product which is differentiated from competitors' counter-

[6] Further expansion of these as well as a total discussion of applications of management science to marketing may be found in Leonard S. *Simon* and Marshall *Freimer*, Analytical Marketing, *Harcourt, Brace* and *Javanovich*, Inc., New York, 1970.

parts. If attained this will obviously introduce considerable pricing flexibility and shift the situation from one of oligopoly perhaps toward something like monopolistic competition wherein the products are somewhat similar but not identical and competition takes place among a larger number of firms. Frozen or canned foodstuffs might be a reasonable example here. Some differences can also be easily seen as between the ultimate consumer and industrial consumer markets. But to the extent that products are virtually undifferentiated, pricing has to be the principal basis for competition.

One new area in which relatively recent developments in the field of operations research may be usefully applied to a pricing problem is in competitive bidding for large deposits. Competitive biddings is not something which should be new to bankers. Bond and stock underwriters continually attempt to assess the price they should offer the issuer relative to the demand in the market place. Negotiated large certificates of deposit for specific maturities are essentially cases of competitive bidding. To the author's knowledge, very few institutions in the industrialized nations have approached this latter case as scientifically as the former.

There is a critical motivation for paying significant attention to the notion of developing competitive bidding models for deposits. As the wealth and sophistication of households increases in the developed economies, we may find ourselves in a situation in which individual branch bank managers have to bid for the funds of the household sector. This is no mere idle speculation. To illustrate, the credit crunches of 1966, 1969, and 1973 in the United States were intensified by the increased financial sophistication of consumers who moved their funds out of savings accounts in financial intermediaries into more sophisticated instruments such as Treasury Bills and U. S. government agency bonds offering higher yields. Similar experience occurred in many European countries in 1972 and 1973. Obviously, bankers could protect themselves against this kind of competition by having regulatory restraints imposed which would make it impossible for the consumer with modest deposits to engage in the aformentioned type of behavior. Though some bankers have taken this position, it is a short run solution which cannot endure because consumer and non-bank competitors can (and do) develop alternative methods of disintermediation. Therefore, financial institutions should be prepared to bid for consumers funds.

In the next several paragraphs, a presentation of the basic concepts of the competitive bidding model are presented. The procedures are analogous to credit scoring models which narrow the area of uncertainty and discretion for the individual bank branch manager to a relatively small domain. These same objectives should be the goal of competitive bidding models to be developed for use in dealing with the household sector.

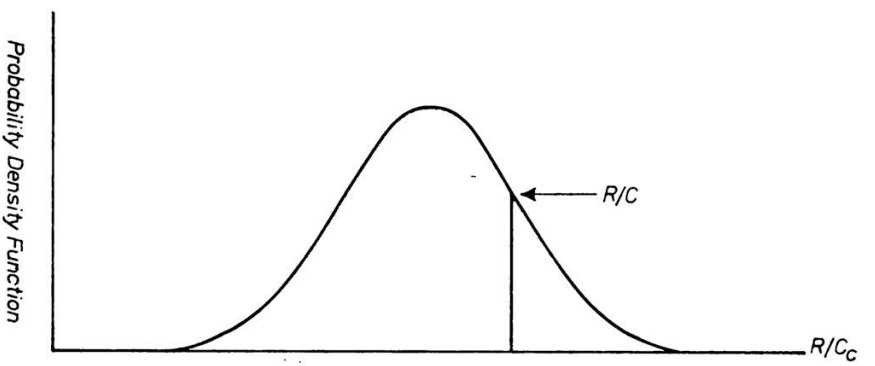
An approach to the problem of deciding what rate to bid for a negotiated deposit might be as follows: Let $R$ be the gross rate of return we can obtain on the investment of funds which we might secure at this moment in time, $C$ the cost of obtaining the funds, or the rate on the negotiated certificate of deposit and $p\,(C)$ the probability that a bid of $C$ will win the competition for the deposits. Then the expected profit, $E$, is

$$E = (R - C)\,p\,(C) \tag{1}$$

Obviously, the probability of winning the bid reflects some judgment about the bids of competitors. It is not unreasonable to suppose that because of special research efforts or because we are informed of the results of most previous contract competitions by customers that we can obtain information on competitors' past bids. For each competitor, we could develop a distribution of the ratio of his bid $C_c$ to our estimated returns $R$ based on the percentage of times particular ratios have occurred as shown in Figure 1.

Figure 1

*Probability Distribution for Competitor's Bid*



The probability of our bank being higher on $C$ and winning the bid is the area to the left of $R/C$, the ratio of our rate of return to our estimated interest cost, or

$$p(C) = \int_{-\infty}^{R/C} f(x)\, dx \tag{2}$$

where $f(x)$ is the probability density function. Equation (2) is appropriate either for the case of a single competitor or if we have combined all competitors into a single composite using the highest competing bid from each previous competition. If there were several competitors and we did not want to combine them, we could calculate the joint probability of all their bids being below ours.

Obviously, the more competitors there are, the slimmer the chances of being the high bidder. This analysis is also based on the assumption that competitors will behave about as they have in the past.

It is certainly feasible to take the above model structure and from it construct a table, or tables, which would provide the individual branch manager (or other appropriate personnel) with guidelines from which they could make bids on individual deposits for specified time intervals. The manager could exercise discretion within certain limits just as is the case in the use of credit scoring mechanisms. Such factors as the past experience of the branch in winning bids for deposits in general and with the given customer in particular and the desire of the institution for a deposit in-flow at given moments in time relative to other investment alternatives for the customer can be worked into this set of guidelines for the manager. This is not the place, however, to develop fully this marketing approach.

The objective of the bidding model as it was structured in this presentation was to maximize expected profit. It is possible to construct similar models with other objectives such as to increase market share or assets (something bankers pursue avidly although the dictates of accepted professional ethics cause them to say profit maximization is their sole goal), to minimize competitors' profits in the belief that such a course might keep them from becoming stronger competitors, to minimize expected losses in situations where the firm is forced to bid and so on. The differences lie principally in the kinds of data which must be obtained as inputs to the analysis.

## 2. Placement of Facilities

Much has been written about the location of bank branches with respect to maximizing deposit growth and earnings potential[7]. In those countries where the number and placement of branches is regulated, banking authorities have tried to concern themselves with preventing what is sometimes referred to as "destructive" competition. It is doubtful that destructive competition exists at all but it is a handy way of describing a situation which many regulators and bankers fear. Obviously, there must be a point of diminishing returns with respect to the introduction of branches into a given geographic region. In general, the potential profitability of the incremental branch (including the present value of the future benefits from becoming established in an area before competitors) would determine management's evaluation of the branch opportunity. In the United States, as mentioned earlier in this paper, the trend has been towards smaller and less expensive facilities so that the capital costs in opening and operating branches can be more readily recovered should they not do as well as anticipated — similar to the pattern existing in many European countries.

Nevertheless, there are a number of different strategies which banks can pursue with respect to the placement of facilities which do not entail a substantial branch structure. For example, in the United States one large commercial bank has disavowed the neighborhood concept adopted by most of the commercial banks and instead concentrated on the development of regional offices of quite large size offering a broad array of services. A sales force has been attached to each of these large regional centers. They secure business in the field and bring people into the office only as required. The success of very large unit banks in states which prohibit branching, such as the multi-billion dollar First National Bank of Chicago and the Continental Illinois Bank is also illustrative.

Although branching is not the only way for a bank to expand and serve its market, it is often the most profitable way. Care must be taken in establishing branches, though. Government regulatory agencies may not appreciate the closing of an unprofitable branch. In its role of protecting the public interest, the regulatory agency may desire to have branches introduced into areas where there presently are no banks, limit

[7] See, for example, Robert L. *Kramer*, "Forecasting Branch Bank Growth Patterns", Journal of Bank Research, Vol. 1, No. 4, Winter 1971, pp. 17 - 24.

the number of branches they will approve and question the quality of management if too many branches of a single organization are closed. Consequently, fear of regulatory retaliation may keep a branch facility open. Thus, great care in locating branches and developing branch systems is incredibly important to the successful operation of the institution, regardless of the level of costs incurred.

A number of kinds of research techniques can be applied to the branch location decision. The more useful of these models are sophisticated variations of *Reilly*'s work on the pulling power of a particular retail location[8]. He hypothesized that persons living in a particular area were attracted to one or the other of two possible sites according to a formula identical to the laws of gravitational attraction. By considering each potential pair of sites, *Reilly* was able to locate the "breaking point" along major arteries connecting two sites where consumers would be indifferent, thus defining the trading area of any gaven site.

A recent model in the tradition of *Reilly*'s work takes the form[9]:

$$P_{ij} = \frac{A_j / T_{ij}^{\lambda}}{\sum_{k=1}^{n} A_k / T_{ik}^{\lambda}} \tag{3}$$

where $P_{ij}$ = the probability of a consumer at location $i$ traveling to a shopping center $j$

$A_j$ = the square feet of selling space devoted to the particular class of goods by shopping center $j$

$T_{ij}$ = the travel time or distance from $i$ to $j$

$\lambda$ = an empirically estimated parameter that reflects the effect of travel time on various kinds of shopping trips

$n$ = the number of shopping centers

This approach can be used to establish equiprobability contours about any particular site just as *Reilly*'s laws established breaking points. Expected sales is then obtained by multiplying the probability of purchase for customers in a given locale by the average monetary value of a purchase and summing over all consumers. Another probabilistic model for site selection that has been used with some success contains an element

[8] For a summary of *Reilly's* work see David L. *Huff*, "A Probabilistic Shopping Center Tract Areas", Land Economics, Vol. 39, No. 1, February 1963, pp. 81 - 90.

[9] *Ibid*, p. 86.

based on the distance of the buyers from the location and the brand or institutional preferences of the buyers[10].

The preceding model can be applied to branch location problems. The physical size of the whole bank facility could be analogous to the square feet of selling space for a given product class. Generally, the loaning authority of a branch manager is related to the physical size of his operation; a manager running an office which has only two tellers and limited other facilities is not likely to have same discretion or authority as one running an office employing twenty to thirty persons. Consequently, larger size branches are likely to have more important customers who want the personal attention of officers who are substantially senior, on the average, to ones in smaller branches. Larger branches are also likely to serve more consumers. Thus, the loaning authority of the manager may be used to specify ($A_j$) in equation (3). The logic is perfectly reasonable. Consumers will travel greater distances to larger facilities if they are after larger loans. A further reflection upon the material presented earlier on competitive bidding would indicate that the same kind of rationale might apply. Should the consumer wish to negotiate a very large certificate of deposit he would again be looking for a branch manager with larger discretionary authority to negotiate rates.

Application of the location model requires examination of data about the location of consumers relative to various sites, identification of the set of alternatives available to them (i. e., other bank or competing facilities) as well as the loaning and negotiating authority of the individual branch managers. Some compromises may have to be made in developing the data; for example, calculating the distance from each potential customer's home to the alternative branch banks would be very laborious, so summary measures such as the geographic center of a block or a census tract are sometimes used. Similarly, straight line distance is sometimes substituted for $T_{ij}$, travel time. The model has been utilized quite successfully for locating supermarkets, franchised restaurants, chain stores and similar retail facilities. There really should be relatively little difficulty adopting this model to an important banking problem.

[10] Theodore E. *Hlavac*, Jr., and John D. C. *Little*, "A Geographic Model of an Urban Automobile Market", in Reference Papers on Market Oriented Management Systems, M. I. T. Industrial Liaison Symposium, M. I. T. Working Paper 225 - 66, March 29, 1967.

### 3. Improved Efficiency of Business Development Personnel

Many larger banks employ people to solicit new customers and develop additional business from existing customers. Although the function is referred to as business development, it is simply the equivalent of sales work in most marketing organizations. A key to maximizing the efficiency of the salesman is the effective utilization of his principal resource, time.

The salesman has a limited number of selling hours that he can devote to customer contact. Although there may be about 160 hours in a working month, so much of a salesman's time is spent in travel and waiting, clerical duties such as filling out reports, planning and the like that effective contact hours are usually much less. Since actual selling time is a scare resource, the firm's objective must be to allocate it in the most productive manner possible. There are really two questions here: first, how should a given salesman's time be allocated among the customers and prospects assigned to him, and second, how many salesmen should the firm employ.

One approach to the question of when to call makes use of a *Markov* chain analysis[11]. Suppose that the problem is to determine how much effort (that is, what number of calls) should be made to convert a prospect into an account. The following assumptions must be made in order to apply Markovian analysis: first, each prospect is of equal value to the firm if converted into a customer; second, each prospect is visited only once during the time period used for analysis; and third, the matrix of transition probabilities (shortly to be developed) is independent of the initial age distribution of customers in the various states and is constant over time. Although these assumptions may appear to be in contradiction to an actual marketing situation, certain modifications can make them conform to the real world. For example, customers can be stratified into groups according to their potential and a separate analysis performed on each group; the periods can be defined as relatively short, say, one or two weeks, so that a prospect in all likelihood is called upon only once; and some experimentation can test the effect of the assumption of constant transition probabilities.

[11] This was first described by Abraham *Shuchman* in "The Planning and Control of Personal Selling Effort Directed at New Account Acquisition: A Markovian Analysis", in New Research in Marketing, Institute of Business and Economic Research, Berkeley, California, 1966, p. 45 - 56.

After some numbers of calls, a prospect is either converted to a customer or further effort is discontinued because of a decision on the part of the management about the relative ineffectiveness of more than a certain number of calls, $n$, in producing conversion. There are thus two absorbing states, drop ($d$), and sold ($s$), that is, conditions which indicate the process has reached a conclusion, and a number of other states from 0 to $n$ that represent the number of calls a prospect has received.

A probability matrix, $P$, can be developed from actual sales experience. Since $s$ and $d$ are absorbing states, $P_{ss}$ and $P_{dd}$ must equal 1.00. Correspondingly, $P_{sd}, P_{s0}, \ldots, P_{sn}$ and $P_{ds}, P_{d0}, \ldots, P_{dn}$ must all equal 0. All the other probabilities in the $P$ matrix can be found by taking the ratio of the number of prospects who had received a particular number of calls at time $i$ and had received another call at time $i + 1$ to the total number of prospects in all states.

Since the prospect cannot jump states — for example, move from a situation of having received two calls to having received four calls in one period — or move to a lower state, all the elements except those in the diagonal represented by an increase of one in the number of calls received must be 0. Thus, if the bank sets $n = 6$ as the maximum number of calls a prospect will receive, the $P$ matrix might look as follows:

$P =$

| | sold | dropped | Number of visits received | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | $s$ | $d$ | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| $s$ | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $d$ | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 1 | .05 | .15 | 0 | 0 | .8 | 0 | 0 | 0 | 0 |
| 2 | .10 | .10 | 0 | 0 | 0 | .8 | 0 | 0 | 0 |
| 3 | .15 | .05 | 0 | 0 | 0 | 0 | .8 | 0 | 0 |
| 4 | .20 | .10 | 0 | 0 | 0 | 0 | 0 | .7 | 0 |
| 5 | .05 | .35 | 0 | 0 | 0 | 0 | 0 | 0 | .6 |
| 6 | .05 | .95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

The table indicates, for example, that after receiving two calls, a prospect has a probability of .80 of receiving a third call, .10 state of being dropped from the prospect list and .10 of being sold. Through suitable steps using matrix algebra it is possible to obtain the number of prospects sold or dropped each period when the sales system stabilizes.

The number of conversions of prospects to customers per period is, of course, dependent upon several other factors. Some of these factors are not affected very readily by a change in management policy. For example, the number of prospects seen per period cannot be easily altered given that the waiting time to see the prospect, the travel time, the length of time necessary for an adequate sales presentation, and so on, all take a large proportion of the working day of the salesman, while overtime is effectively precluded by customer unavailability. Similarly, a change in the length of the period of analysis does not really affect the underlying relationships. One variable that can readily be influenced, however, is $n$ the number of calls made on a customer before ceasing further efforts; correspondingly, $n$ will also influence the rate at which the pool of potential customers, or prospects, is consumed.

One of the chief limitations of the foregoing model lies in the establishment of the transition probability matrix $P$. The basis is usually historical data. However, there is an interaction effect between the salesman and the prospects in a territory. Even if one assumes that the salesman's skill in presentation of his product is relatively constant, his success might vary substantially if he were moved to calling upon prospects in a different industry or geographical area. Further, within any given territory some customers will react more favorably to the particular salesman but over time there will be fewer and fewer prospects to whom this business development officer has substantial appeal; consequently, the transition probalities are probably not stable over a great many periods. By paying careful attention, say through reasonably frequent re-evaluation of the $P$ matrix, much of the difficulty can be overcome. In essence, the steady state, i. e., stability, will never be attained, and the question is whether the elements of $P$ will be stable for a long enough number of periods to use the model just described in planning call policy.

Another characteristic of this model is that it is highly individual-oriented and a separate analysis must be undertaken for each development person. This should be no great problem on a computer, however, and this focus offers another opportunity to the management for sales force control. It is possible to determine the variances as well as the expected values for both the number of prospects in a state and the number of conversions per period[12], and therefore standard control

[12] *Shuchman,* op. cit., outlines the procedure for this.

chart techniques can be applied to each salesman's activities. In fact, when a data point occurs outside a limit, it may be an indication that it is an appropriate time to reevaluate the $P$ matrix.

The foregoing model has been applied to a much lesser extent than the preceding two, and therefore, its enduring value may be more questionable. However, given the substantial costs of operating branches, it is not inconceivable that banks may place greater emphasis on their sales forces and, in the limit, substitute travelling salesman for branches. Then the derived value of solutions from this model will become much greater, perhaps inducing increased usage. In the interim, the model has substantial instructive value in aiding management in thinking through the problems of sales call policies for new accounts.

## IV. Lessons to be Learned

The preceding three examples of the application of management science/operations research type modelling to the bank marketing environment are illustrative of the kind of innovative thinking which will be required for financial institutions to hold their relative competitive positions in the next decade. Banks have already come a long way in their adoption and acceptance of the more sophisticated techniques of marketing, especially in terms of conscious development of planning, strategies and tactics. The next quantum jump will undoubtedly be in the utilization of the analytical marketing tools already in fields outside banking.

A particular characteristic of all three models presented is that a willingness to think quite differently in terms of bank operations is necessary. To know how to specify the relevant banking parameters and integrate them as, say, in the case of the loaning and negotiating authority of the individual branch manager is a difficult task. In fact, this is the essential element of success. Each adaptation can be validated on a small scale before instituting company wide policies; the highly fractionated structure of most banks as evidenced in a large number of branch offices often permits the required data collection and experimentation.

In sum, then, this paper is simultaneously a forecast and a plea; a forecast that the rapid rate of change in the technology of bank marketing will continue and, perhaps, accelerate culminating in the relatively widespread use of highly quantitative decision-making aids; a plea for

current bank management to recognize this trend and take steps to minimize the effects from the, possibly substantial, market place dislocations which are certain to ensue. Time will tell the accuracy of the forecast as well as the value of the lessons for bank management embodied in the preceding plea.

## Zusammenfassung

### Einige Anmerkungen über analytisches Marketing in Forschung und Praxis der Banken

Die gegenwärtige Struktur des Bankgeschäfts wird sowohl durch die Anwendung aggressiver Marketingtechniken als auch durch die technologische Entwicklung und die Neugestaltung der institutionellen Rahmenbedingungen verändert. Der Aufsatz versucht zu erkunden, warum diese aggressive Tendenz gerade heutzutage aufgekommen ist und veranschaulicht, wie sehr die moderne Technologie, die bekanntlich sehr schnell wechselnde Operationen ermöglicht, künftig eine noch stärkere Berücksichtigung von Marketing-Gesichtspunkten erfordert. Eine stärkere „Verwissenschaftlichung", wie sie zum Beispiel die Anwendung von Operations Research und anderer stark analytischer Verfahren darstellt, dürfte der entscheidende Ansatzpunkt für eine bessere Effizienz des Marketing sein. Hierzu werden als praktische Beispiele Fälle der Unternehmensentscheidungen, des Depositenwettbewerbs, der Anlagedisposition und der Produktivitätssteigerung im personellen Bereich gebracht.

## Summary

### Some Observations on Analytical Marketing in Banking Research and Practice

The structure of banking is changing rapidly due as much to the use of aggressive marketing techniques by banks as to financial reform and technological innovation. This paper explores why this new aggressive attitude has come to the fore and then illustrates how changing operations technology is going to require even greater emphasis on marketing tactics in the future. Increased sophistication as regards the use of operations research and other highly analytical approaches to problem solving is suggested as one of the main vehicles for obtaining greater efficiency in marketing. Illustration of the application of such tools to three areas of management decision-making, competitive bidding for deposits, placement of facilities and increasing the efficienty of business development personel, is given.

## Résumé

### Quelques Observations sur le Marketing Analytique dans la Recherche et dans la Pratique des Banques

La structure actuelle des opérations bancaires subit des transformations occasionnées par la mise en oeuvre de techniques agressives de marketing, par le développement de la technologie et par la redéfinition des conditions institutionnelles générales. L'article tente de découvrir le motif des l'apparition actuelle de cette tendance agressive et prouve que la technologie moderne, qui, on le sait, perment de très rapides modifications dans les opérations exigera à l'avenir une plus importante prise en considération encore des divers aspects du marketing. Un plus grand recours à la science, comme par exemple l'application d'opérations de recherche et d'autres procédés particulièrement analytiques, devrait être le point essentiel de départ d'une efficience supérieur du marketing. Et des exemples concrets sont détailés à propos du processus décisionnel dans l'entreprise, de la concurrence dans la collecte des dépôts, des dispositions de placement et de l'accroissement de la productivité du personnel.