

PRICING AND FORECASTING IN AN OLIGOPOLY FIRM¹

BY

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Introduction

ONE of the most perplexing of all marketing systems is the so-called 'undifferentiated oligopoly', in which small numbers of large producers of homogeneous products compete for the business of processors. Such industries are typically capital intensive, and in the U.K., basic process chemicals, cement, semi-finished steel,² aluminium³ and synthetic fibres provide good illustrations.

The oligopolist faces a complex market environment for his products. Typically he serves a variety of sub-markets, each with a wide distribution of firm size. Each sub-market has its own unique demand characteristics, and within each sub-market the demand characteristics of individual firms vary dynamically over time. Finally, the legal environment ensures that actions of his few competitors are forever uncertain.

However, such a complex environment intersects with the highly capital intensive nature of the oligopolists' production system. Capacity utilization, an important consideration in such circumstances, is therefore both difficult to plan for in the long and medium run and to obtain in the short run. In the long run the crucial decisions generally surround investment in fixed capacity while in the medium and short run, marketing strategy and marketing tactics to achieve capacity utilization assume greater importance.

Of major significance in the medium and long run, therefore, is a forecast of demand. The successful oligopolist must be able to understand the complexities of his environment to enable 'good' forecasts of the future to be made. In the short run the oligopolist is concerned with decisions about individual potential orders which occur on a daily basis. When operating at less than capacity, the temptation to reduce price (normally the most important marketing variable) to obtain business is severe. Since a substantial fraction of total costs are fixed, major allowances in price on individual transactions are possible, while still allowing incremental contribution to

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² British Steel Corporation, *Second Report on Organization*, London: H.M.S.O., 1969.

³ National Board for Prices and Incomes, *Costs and Prices of Aluminium Service Manufacturers*, London: H.M.S.O., 1969.

overhead. However, the possibility of retaliatory action by competitors is a major disincentive to such action.

The oligopolist must develop a clear understanding of the issues involved for optimal decision-making. In addition, he must develop a set of decision systems, more or less complex, capable of collecting, storing and processing information and producing decisions.

This paper presents an in-depth study of two systems developed by a major U.K. oligopolist — one system for sales volume forecasting, the other system for day-to-day decisions on pricing.

The Company

The study was performed in the fabricating division of the company, whose products are intermediate goods and are sold to producers of other products, not consumers. These products, which fall into two broad categories (*X* and *Y*), are sold directly into three broad end-use markets; industrial, transport and building, and indirectly through stockists. There is some export business. Figure 1, a simplified organization chart, gives an idea of the interrelationships between organizational elements, though it communicates little about the functioning of the organization.

Reporting to the Managing Director, through his Assistant, are the two Production Directors of product groups *X* and *Y*. Corresponding to the production operations are two Commercial Managers, responsible to a Commercial Director, with pricing as their major responsibility. The marketing operation is headed by the Sales Director to whom report six General Managers who are organized by end-use market. The company's major marketing effort of direct sales is expended through the General Sales Managers for industrial, transport and building, to each of whom report three geographically organized Regional Sales Managers and a Marketing Manager. Responsibility for the company's indirect sales through stockists rests with the General Sales Manager Stockholder Services, assisted by two Regional Sales Managers and a Commercial Manager. The remainder of this segment of the organization consists of the General Manager for Application Development, who supervises new product development, and the General Manager Sales Administration who supervises, in addition to sales administration, sales promotion, market research and export sales. It is important to remember that the two decision systems discussed here, although of fundamental importance to smooth operations, constitute only a small part of the responsibility and effort of each of these members of the marketing organization.

Why Focus on Decision Systems?

For a study of pricing and forecasting in undifferentiated oligopoly the

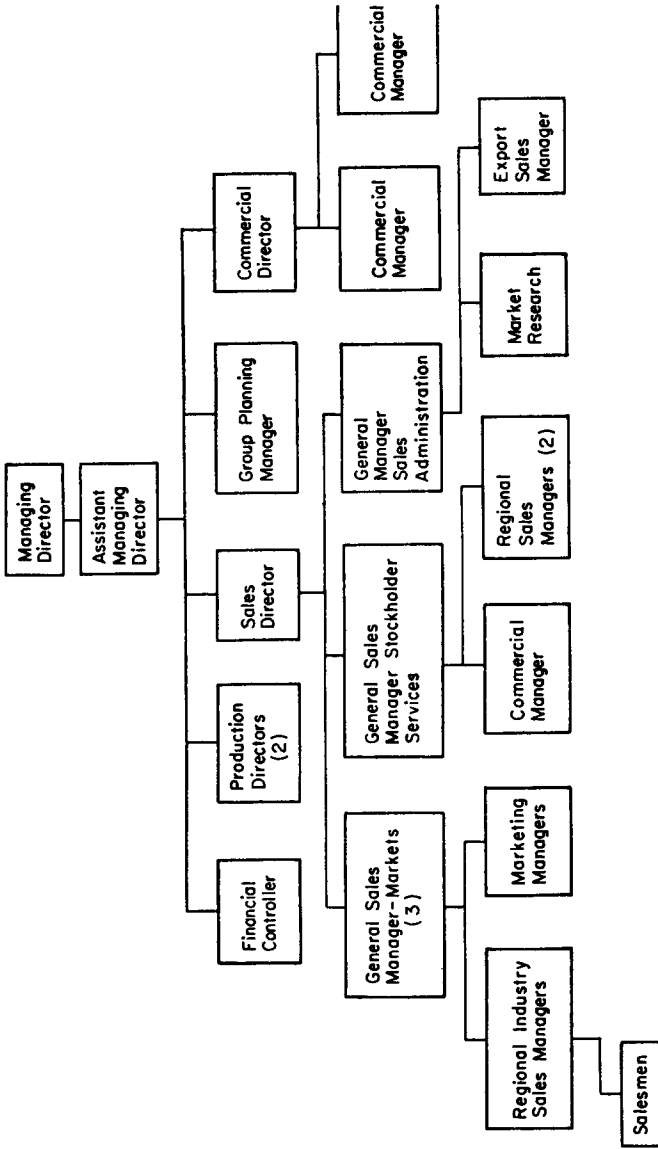


Figure 1. Simplified organization chart*

* Level in chart does not necessarily depict level of responsibility.

'firm' is not the relevant decision unit. Neither, in general, is any single formal sub-component, because no single unit has sole responsibility for making these particular types of decisions. Hague,⁴ for example, in his study of pricing in thirteen U.K. companies isolated two major pricing systems, one with small groups of participants and one with large, although for the large group pricers, comprising almost 50 per cent of his sample, 'it was not always easy . . . to be absolutely sure where and when pricing decisions were being taken'.⁵ More concretely, the responsibility for decisions concerning trade-offs between price (or margin) and volume is often shared by elements in both production and marketing.

A more immediate reason for being interested in such decision systems is that their design and functioning often reveal some of the interpersonal and political realities of management. The goals and motivations of participating managers, for example, can have major effects on the processes. Lowe and Shaw, in a study of sales budgeting in large retail chains, found that patterns of resource allocation were subject to substantial biases and counterbiases.⁶ The biases included elements of the reward system which encouraged high sales volumes, desire to please central management and very short-term job protecting behaviour. Counterbiases were chiefly provided by upper-level managers who had come up through the ranks and had themselves experienced the biases discussed above. Realistic design of a marketing decision system must take into account these organizational problems as well as the technical characteristics of the decision to be taken.

Thus a study of decision-making for pricing and forecasting must consider all elements involved in the decisions. The focus of this study is upon the decision system; those groupings of organizational elements, in general unique *per* decision type, through which information flows, is processed and decisions taken. To be more specific, the two systems studied are the following:

1. *A volume forecasting system*, part of a forward planning system and covering a relatively short time period — one year. The forecasts form the basis for both production and marketing planning for the planning cycle, a one year period with fixed initiation and termination dates.
2. *A short-term pricing system*, in which requests are considered for price adjustments on particular potential transactions. This system functions much more frequently and quickly than the forecasting system.

The systems are described in flow chart form. They are based on data

⁴ Hague, D. C., *Pricing in Business*, London: George Allen and Unwin, 1971.

⁵ *Ibid.*, p. 251.

⁶ Lowe, E. A. and Shaw, R. W., 'An Analysis of Managerial Biasing: Evidence from a Company's Budgeting Process', *Journal of Management Studies*, Vol. 5, No. 3, October 1968, pp. 304-15.

collected in personal interviews which included validation using the analytic charts themselves as interview guides.⁷ Of course, such systems are organic; they change constantly and are usually modified abruptly when a major reorganization occurs. The descriptions are thus a snapshot of the true procedure at a given point in time.

The Forecasting System

An overall view of the development of the annual forecast is shown in figure 2. It is the result of a reconciliation of macro 'top-down' market forecasts and synthetic 'bottom-up' forecasts developed in three market areas; direct U.K. sales (75 per cent), U.K. sales through stockists (15 per cent) and export sales (10 per cent).

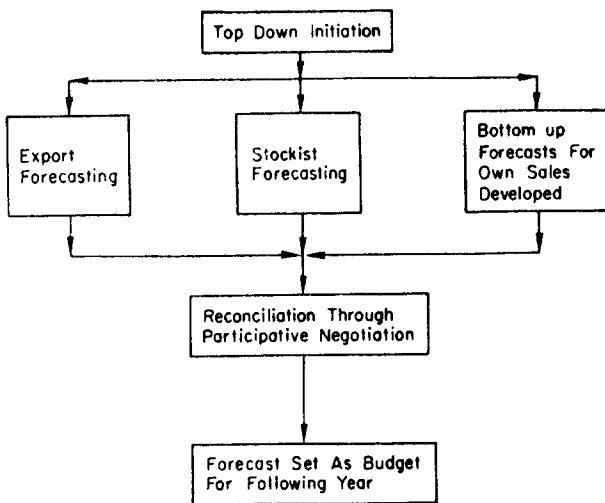


Figure 2. Bloc summary of forecasting system

It should be noted that the top-down market forecasts are themselves input into the U.K. 'bottom-up' forecasts.

Top-down market forecast. As shown in figure 3, initiation of the forecasting cycle is determined by the schedule for preparation of the annual operating budget. The requirement of ample time tends to bring forward the initiation while desire for maximum information from the current year tends to push it back.

⁷ Hulbert, J. Farley, J. U. and Howard, J. A., 'Information Processing and Decision Making in Marketing Organizations', *Journal of Marketing Research*, Vol. 9, No. 1, February 1972, pp. 75-7.

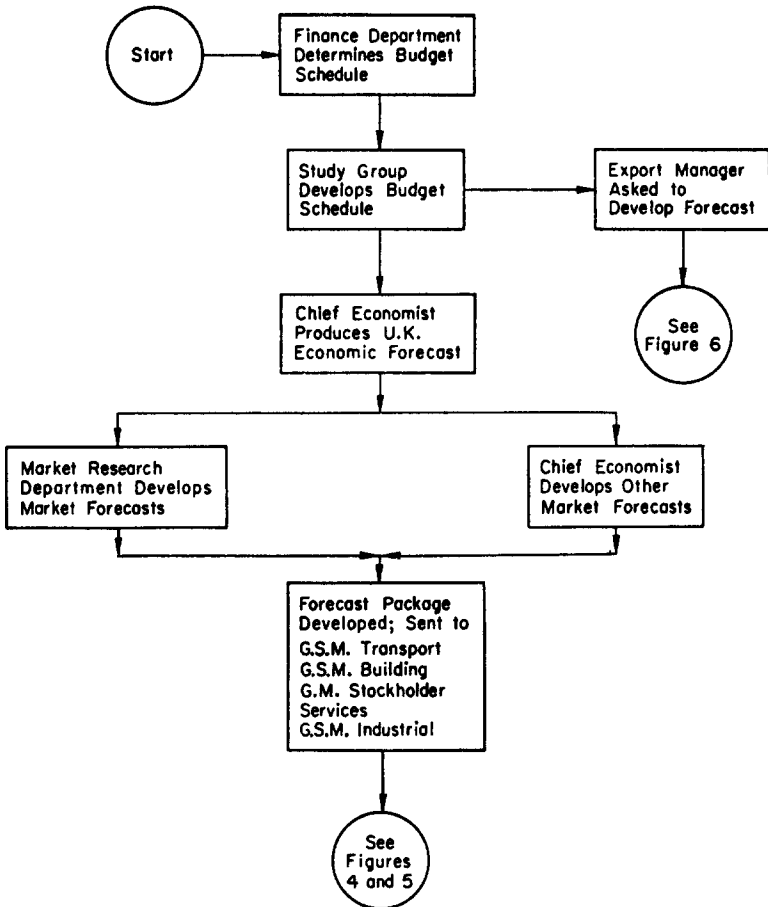


Figure 3. Top-down forecast

A study group of planning and market research personnel prepares aggregate forecasts of the national economy for the succeeding year and specific forecasts of fifteen key end-use markets. Specific technical expertise is blended to meet these organizational needs. Economists from the planning department prepare aggregate projections and choose specific end-use forecasts for which demand is clearly derived from aggregate developments. Those forecasts involving specific customers and market know-how are handled by market research, who employ trade association statistics, historical performance data, past survey data and *ad hoc* information on specific end-use markets accumulated continuously for this purpose. The study group, in the person of the Market Research Manager, passes the forecasting package to

the three General Sales Managers for direct business; industrial, transport and handling, and to the General Manager Stockholder Services, for the initiation of 'bottom-up' forecasting. The export forecast has been previously initiated upon development of the schedule by the study group.

Bottom-up forecast — direct home sales. The development of bottom-up forecasts is initiated when the General Sales Managers (G.S.M.s) distribute the aggregate end-use forecasts to both the Regional Industry Sales Managers (R.I.S.M.s) and the marketing managers (figure 4). Each R.I.S.M. asks his salesmen to produce forecasts by product groups X and Y for each of their major customers, and a composite residual by product group for the remainder. The forecasts are prepared on three bases in an attempt to overcome the inadequacy of single point estimates. The first basis is called 'base load' sales: those sales for which there is a high degree of certainty of attainment, given that the company continues its pricing strategy (see pricing section). The second forecast is of those sales which could 'reasonably be expected' to be obtained with the current strategy. The third forecast is of particular pieces of business which would be obtained if specific tactical decisions were made. The R.I.S.M. prepares his own set of figures which are then reconciled with those of each salesman and aggregated.

The R.I.S.M. presents his reconciled, aggregated forecasts to his Marketing Manager, the G.S.M., and the Market Research Manager. Estimates for major accounts are questioned and discussed individually, sometimes in comparison with *ad hoc* forecasts prepared by the Marketing Manager. Particular attention is directed to accounts where a reduction in sales is forecast. The Marketing Manager then aggregates the forecasts from the R.I.S.M.s and together with the G.S.M. makes an initial comparison with the top-down market forecasts, the final agreed forecasts being sent to the study group, thus completing the development of the 'bottom-up' forecasts for direct sales.

Bottom-up forecast — stockist sales. The industry stockists are divisible into two groups from the company's perspective — those that are aligned (transact more than 75 per cent of their business with the company) and those that are not. The Sales Managers Stockholders Services (S.M.S.S.), having worked with the General Manager Stockholder Services to prepare overall stockist forecasts by region, prepare forecasts for the aligned stockists to whom the Sales Managers have ready access, individually and for the non-aligned as a composite, by market and product group, (figure 5).

Their forecasts are forwarded to the General Manager Stockholder Services who reviews them in the light of market forecasts through stockists prepared by the three Marketing Managers and the regional forecasts developed earlier. He meets with the Sales Managers individually for this purpose and sends the final aggregated figures to the study group.

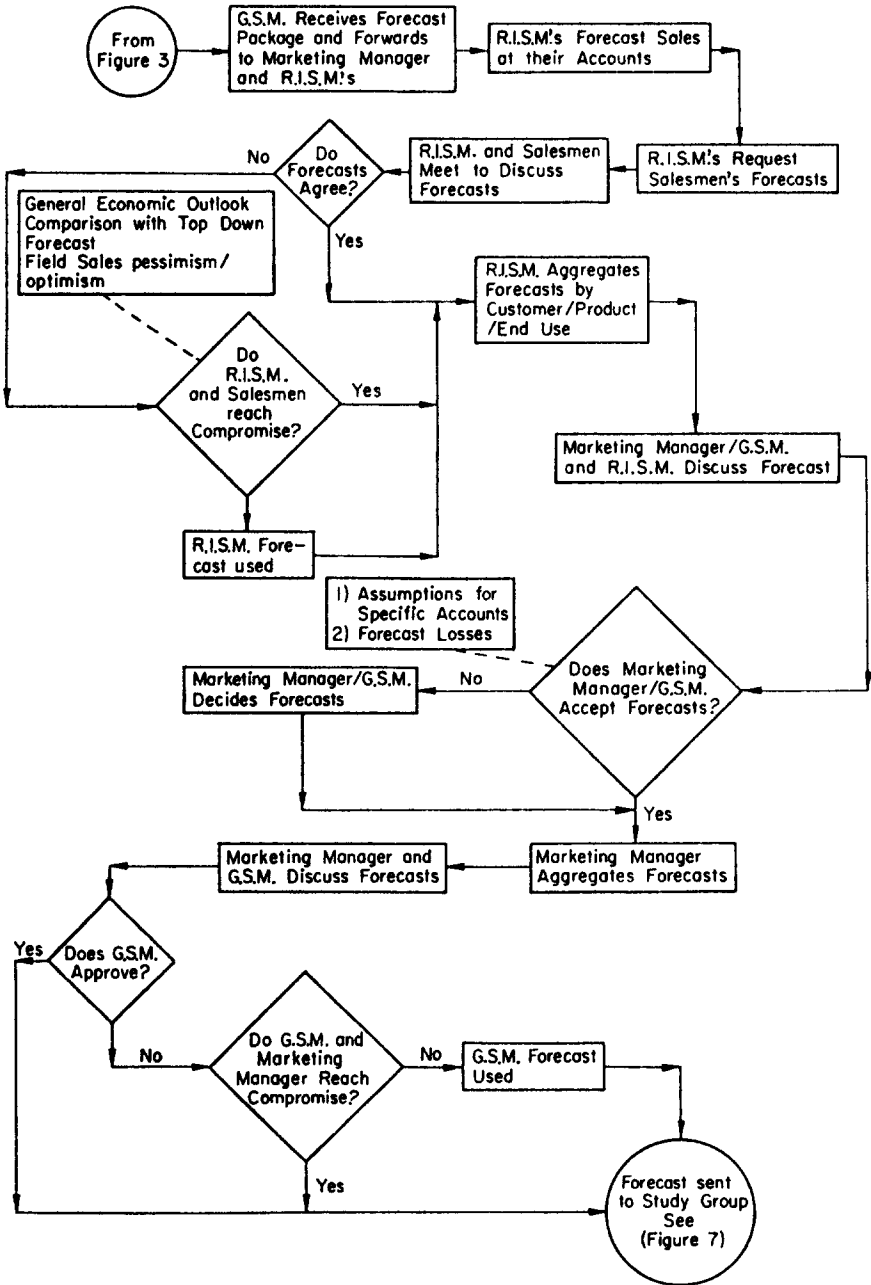


Figure 4. Bottom-up forecast for direct sales

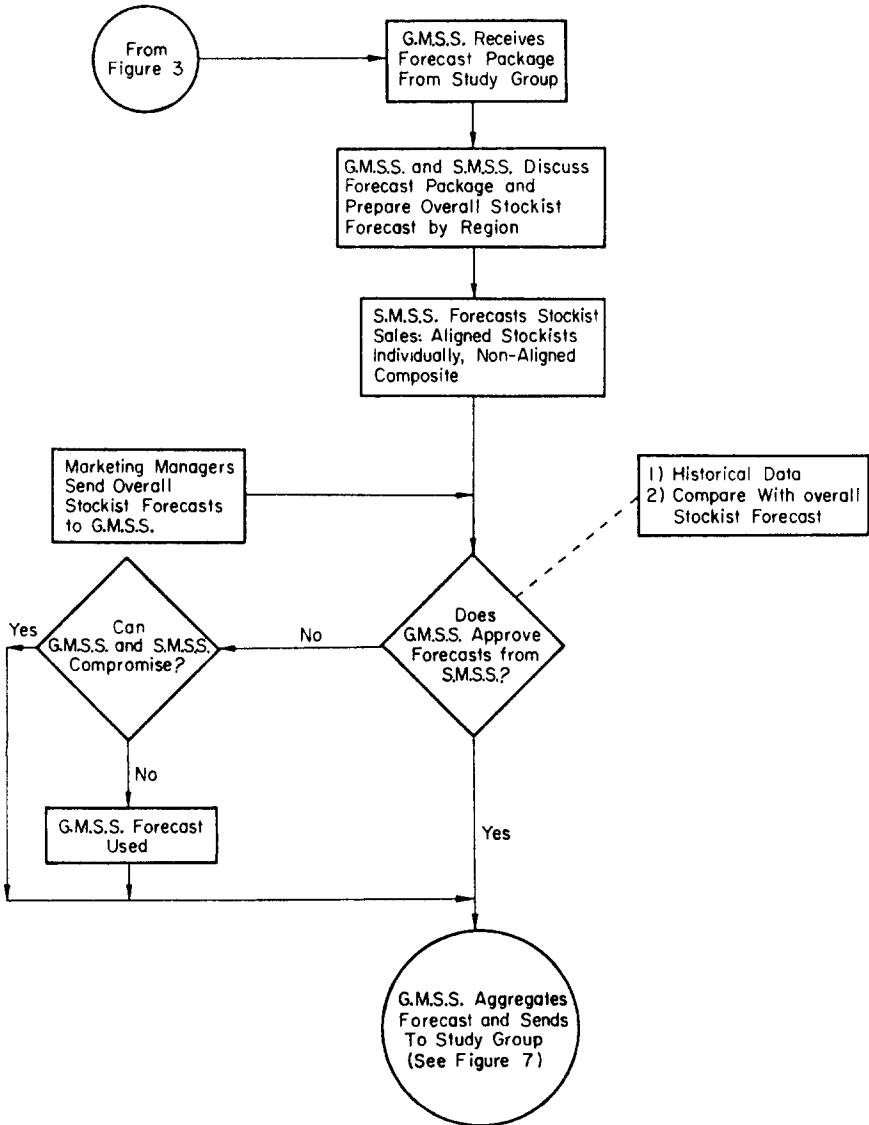


Figure 5. Bottom-up forecast for stockist sales

Bottom-up forecast — export sales. The export forecast process (figure 6) is quite different from those previously discussed. There is no formal background document to draw upon and no internal check upon the forecast. The Export Manager simply consults with specialist subordinates and

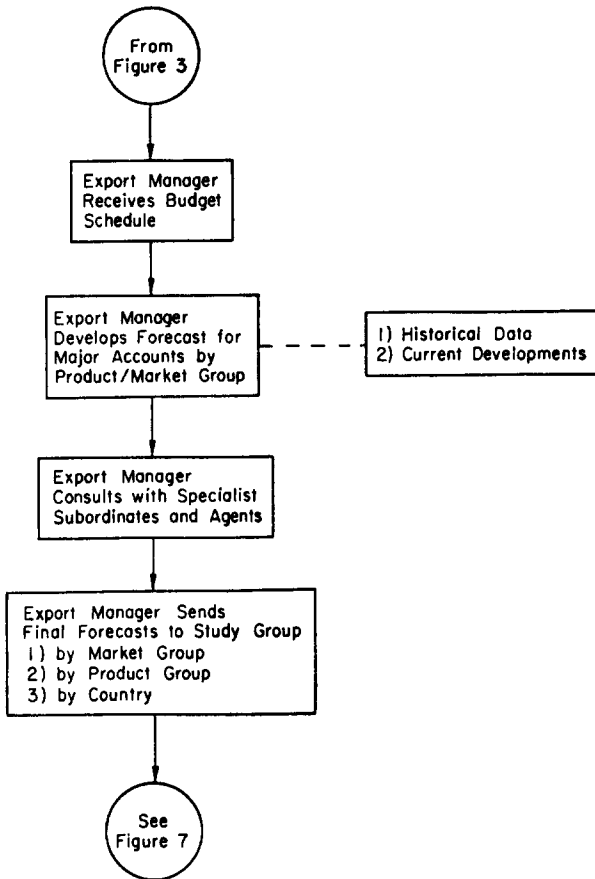


Figure 6. Bottom-up forecast for export sales

agents for major accounts, prepares and develops final figures classified by market group, product group and country. These forecasts are sent to the study group.

Reconciliation of top-down and bottom-up forecasts. The study group performs the aggregation of bottom-up forecasts received from the three General Sales Managers, the General Manager Stockholder Services and the Export Manager. At this stage, however, there is no reason to believe either that the bottom-up and top-down forecasts should reconcile or that either forecast reflects sales volumes that are acceptable for the annual plan. The first step is to reconcile the two forecasts, (figure 7).

Following the initial aggregation a series of meetings ensues. In the first round, the Study Group, together with the Commercial Managers, meet with

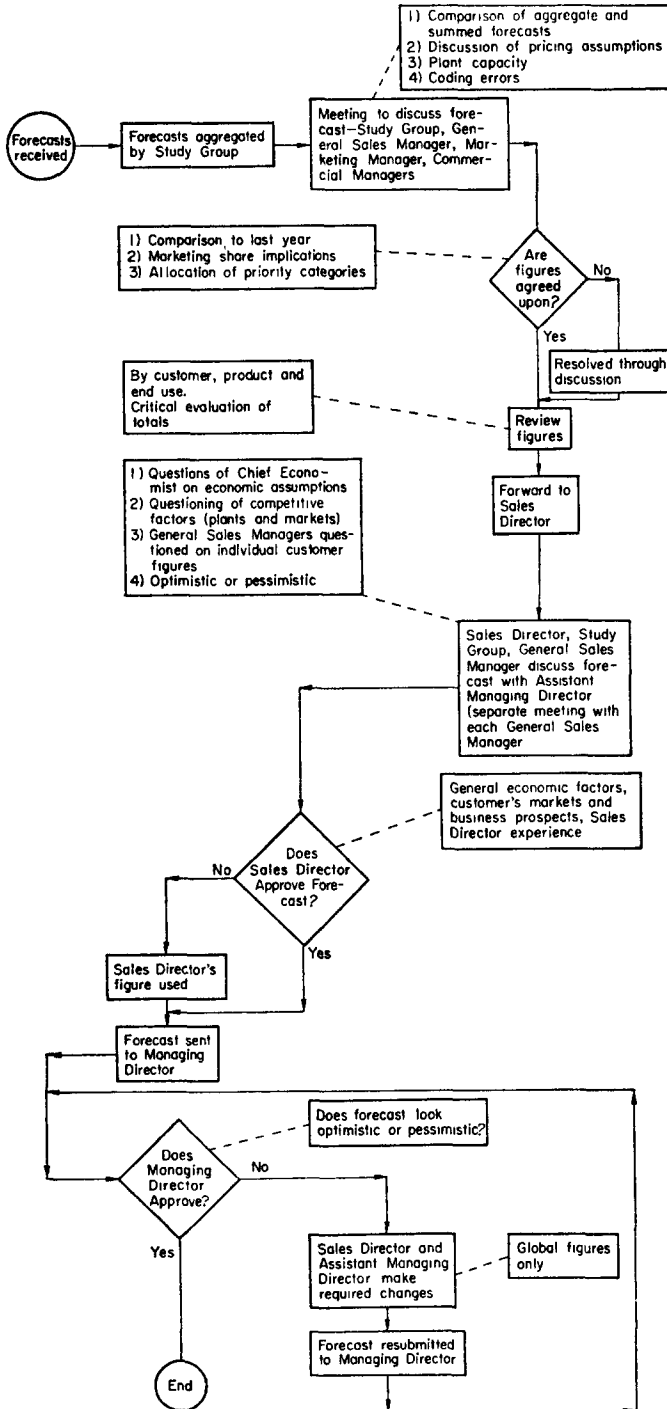


Figure 7. Reconciliation of Top-down and Bottom-up Forecasts

each of the General Sales Managers and their respective Marketing Managers. These discussions focus sharply on pricing assumptions underlying the forecasts, implications for plant capacity, and special customer/market issues. They review the historical data, market share projections and the shifting of allocations among forecast categories, from higher to lower profit items and finally reach agreement on the forecasts.

During these meetings, product-type coding errors which could result in double-counting of business are also eliminated and special attention is paid to requirements and participation with key customers. A few more forecast changes may be necessitated, and these are often implemented directly by the Study Group in consultation with sales and marketing personnel.

The next steps involve a broader examination of strategic matters at higher levels of aggregation. Approval of the Sales Director and the Assistant Managing Director is achieved in another series of review meetings involving General Sales Managers, the Study Group, and the Sales Director. In these meetings, the broad assumptions underlying the aggregate forecast and possible effects of changes in competitive strategies are considered although the General Sales Managers may still be questioned about individual customer forecasts. Subsequent meetings with the Sales Director may be needed to fill in questions about the forecasts before they are submitted to the Managing Director. The special characteristics of the undifferentiated oligopoly are also evident here. Possible reaction of individual competitors as a result of the firm's securing business represented in individual forecast components is a matter of central concern, as several competitors may be planning for the same business. By implication, this is also the point at which price forecasts and volume forecasts come together. Trades of volume and profit margin are made explicitly and in face of the threat of competitive reaction to protect some or all of the forecast volume — particularly the volume forecast to be gained from sales of competitors in earlier periods. This is the point at which the rules of combat for the coming year are formalized, with full understanding that fixed costs constitute a major part of the total costs for all participants so that it is possible for prices to degenerate badly in the short run and still provide marginal contribution to overhead expenses of all competitors. It is also easy to perceive the pressures which motivate the passage of legislation aimed at preventing volume and pricing agreements among competitors in markets such as these.

The Managing Director's review tends to be at macro level and he may change the forecasts because of impending corporate strategic changes of which he is aware. After his approval, the forecast is formally incorporated in marketing planning, budgets and sales targets.

The forecasting system — evaluation. This sort of synthetic forecasting, involving many levels of negotiation, is commonly used in short-term

industrial planning systems. Such synthetic or composite systems bring together the best thoughts (and many times best wishes) of all parties concerned and generate commitment to the final plan hammered out in the consensus. However, these systems also have certain generic shortcomings.

First, planned volumes are, in a real sense, self fulfilling, for means are rarely provided to construct an 'objective' file of the various forecasts which form the bases for the numerous steps in the overall process. These interim or 'working' forecasts could be useful for evaluating the predictive validity of various forecasts inputs. The initial round of forecasts submitted by the sales force, for example, come close to representing what salesmen believe will happen if there are no changes in selling emphasis from the previous time period, *i.e.*, under *ceteris paribus* conditions. The availability of more objective forecasts would frequently be very useful in longer term evaluations of the effects of various marketing strategies involving changes in underlying assumed conditions — *i.e.*, new prices, product alterations, packaging, credit terms, *etc.* Similarly, there is grave danger in failing to separate the budgeting goal formulation from the forecasting prediction process itself. This may in turn cause muddling of planning and control at the point of implementation, allowing operations to veer away from a more nearly optimal path.

Second, the labour intensive nature of the forecasting system may lead to preoccupation with the fixed one-year planning cycle, to the detriment of both longer term analysis and planning and shorter term tactical activities. The former may be driven out by the sheer effort required each year to produce the initial annual plan, while the latter may be sacrificed for focus on shorter term diagnostics about why the annual plan was not met, or for that matter whether the original plan was reasonable in the first place. Synthetic forecasting systems like this are particularly labour intensive for the sales force in developing the first round of individual forecasts, by product and by customer, and this may be a promising point to introduce automated forecasting aids — simple projections based on order entries, forward bookings and/or implications by customer and product class of the aggregate industry forecast, for example. These initial 'objective' forecasts can then be modified by individual salesmen as their first round of activity in the cycle. This suggestion is often made for improving performance and minimizing biases in forecasting associated with a market planning system.⁸ Similarly, the process of iteration and testing alternative pricing and volume strategies in the later rounds of adjustment is painstaking, time consuming and also very labour intensive. Since there is substantial time pressure from top manage-

⁸ Lowe, E. A. and Shaw, R. W., *op. cit.*; Farley, J. U., Howard, J. A. and Hulbert, J., 'An Organizational Approach to an Industrial Marketing Information System', *Sloan Management Review*, Vol. 13, No. 1, Fall 1971, pp. 35-54.

ment to provide the final forecasts at this stage of the system, a simple time-shared computer system which allows quick sensitivity analysis of a given plan to volume and price adjustments would also be useful.

The labour intensity of synthetic forecasting procedures also tends to result in forecasts remaining frozen, rather than being updated to provide realistic real-time control for current activities. Updating would aid the tracking of developments and implementing of control procedures over the planning cycle, which means that computer-based planning adjustment procedures may be useful. Further, the forecasting cycle is strictly determined by calendar time, instead of being geared to natural cycles of product class or end-use market sales over the year. For example, sales to the appliance industry may be several months out of phase with sales of other semi-finished products to industrial users, resulting in some difficulty in preparing 'the' annual operating plan.

The Pricing System

Direct Sales. Although list prices are important in terms of informational content, they are relatively insignificant in terms of a large amount of actual business transacted. The important prices for many business transactions (all for some product classes, in fact) are the concession prices granted to individual customers on individual products. Quoted as percentages off list and stored in records by Sales Administration, they automatically rise and fall as the overall list prices change.

The starting point of the pricing system is thus a set of list prices (the company's formal offering price for its products) and a set of concession prices. The list prices are publicly available to interested parties such as competitors, potential customers and government agencies. An overall list price change is a major strategic event for the company and a decision is taken only at the highest level. The overall set of list prices is altered infrequently although there are individual product changes, additions, and deletions from time to time. A change could be downward; either offensively to increase market share, or defensively to protect market share; or upward, either offensively to increase profit margins or to follow the leader.

The problem to be solved is the trade-off — transaction by transaction over the planning period, between incremental contribution to profit realized from additional business at lower prices and the potential loss in contribution due to a broader decline of gross margins on other products, to other customers, *etc.* When a price inquiry comes to the company, it is forwarded to Sales Administration, where the decision is made on whether to quote directly or to refer the matter to Commercial Department (see figure 8). Such forwarding takes place for non-standard products, for important business which was lost previously, for important new business, for any new

business when prices in the market have fallen or if there has been a major change in competitive activity in either the producer industry or end-use market. In most cases the sales office quotes directly using a set of well-developed decision rules. If a price concession had been made on the product to the customer, the quote is on the same basis as the last time. If there has been no price concession, the customer is quoted list price. The customer either accepts or rejects the offer. If the offer is rejected it is the responsibility of the salesman to follow up with the customer and the first stage of the process is completed.

At this point the salesman has two functions, one informational and one persuasive. Firstly, he is required to obtain as much information as he can about the terms of the successful competitor (if it is not his own company). This information would be likely to include: whose offer is to be accepted, at what delivery terms, what credit terms, *etc.*? Secondly, he attempts to obtain agreement on keeping the business open until a further quotation can be made by his own company.

On the basis of his success in gaining information and persuading the customer to keep the business open, the salesman again has two alternative courses of action. If he has good competitive information, if the customer has agreed to consider another offer, and if the salesman believes that competition should be met, a 'Report on Competition' is filed with action recommendations to make a price allowance. Time pressures may dictate telex transmission of information and recommendations which the 'Report on Competition' subsequently confirms. If he does not believe that competition should be met, he files a more cursory 'Business Lost' form. 'Business Lost' is also reported to his manager and for information to the Commercial Department in the event that the customer will not accept rebids and/or adequate competitive information is not obtained. In general, the salesman operates on his own initiative with respect to these procedures and decisions.

The Commercial Department is the focal point of the company's pricing, acting within strategic guidelines laid down by the Board of Directors. The pricing policy concentrates on the company's major customers, defined as those whose total consumption of the product is greater than a floor value. In turn, these are divided into three categories: (a) purchase more than the floor amount from this firm, which is the major supplier; (b) purchase nothing from this company but are a major account for a competitor; (c) customers who split their business between a number of suppliers. The price policy states that:

1. The company will not lose business at any of company's A accounts while it remains profitable to keep it. That is, pricing activity will

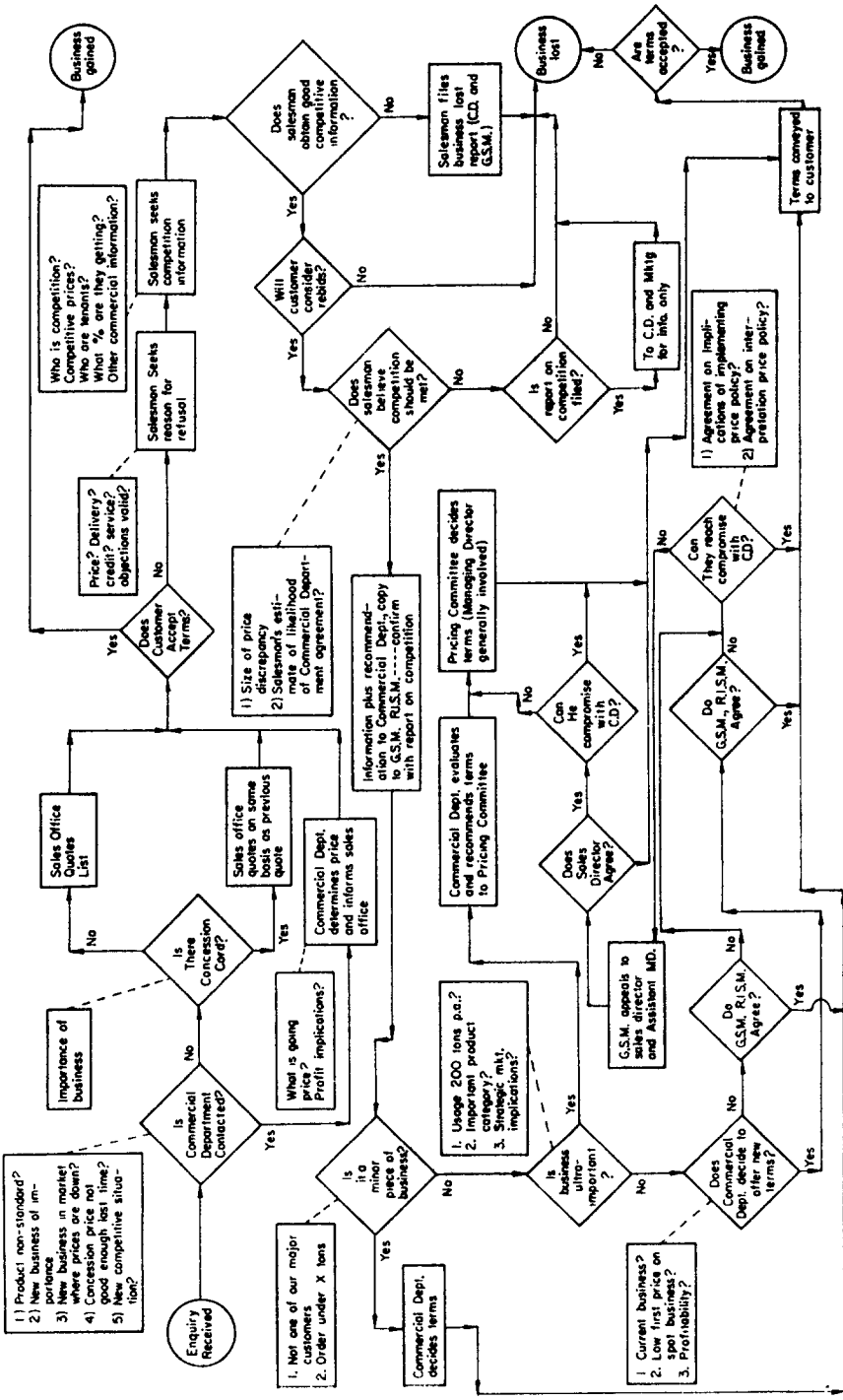


Figure 8. Pricing system for direct home sales

- concentrate on maintaining this business, subject to some minimal contribution rules.
2. The company will not attempt to obtain business at any category B account on price advantage alone, but will offer competitive prices or, at times, a slight premium.
 3. For category C accounts with an established competitive pattern, the company will attempt to maintain their share of the business, on a price basis if necessary.

Three broad types of pricing decisions reach the Commercial Department. Firstly, there are those decisions which are considered relatively unimportant and upon which the Commercial Department has the final word. If the business is for a non-major account, for example, the Commercial Department makes a decision and the terms are conveyed to the customer by the salesman. The second category of decisions involves business with major accounts but moderate usage. Here, the Commercial Department decides the terms, but the General Sales Manager and the Regional Industrial Sales Manager may raise objections of interpretation of pricing policy. When this happens and a compromise cannot be reached, the General Sales Manager appeals to the Sales Director, who attempts a compromise with the Commercial Department. If no compromise is possible then the matter is referred to the Pricing Committee, a body which is convened as necessary. Its membership includes the Managing and Assistant Managing Directors, the Sales Director, the Commercial Director, and the Production Director. Commercial Managers and General Sales Managers may also be called in for their expert knowledge. Thus the pricing process, like the forecasting process described in the last section, may involve intense negotiation to resolve intra-organizational disagreements.

The Pricing Committee is directly involved in the third category of decisions, involving areas over which the Commercial Department does not have jurisdiction. Thus if the customer is a very heavy consumer of the product, or if the product category is especially important, or if the decision would have broad strategic market implications, the Commercial Department evaluates the proposal and recommends action to the Pricing Committee.

The centralization of pricing decisions in the Commercial Department and the role played by the Pricing Committee, the highest decision-making body in the company, reflect the importance placed by the company on pricing as a marketing variable. Clearly, the role of pricing relates to the oligopolistic nature of the industry, its history of overcapacity and of soft prices. By defining a pricing policy and maintaining consistent adherence, the company not only ensures that it acts consistently, but also that it is seen to be acting consistently by its competitors. Thus the policy of segmenting the market,

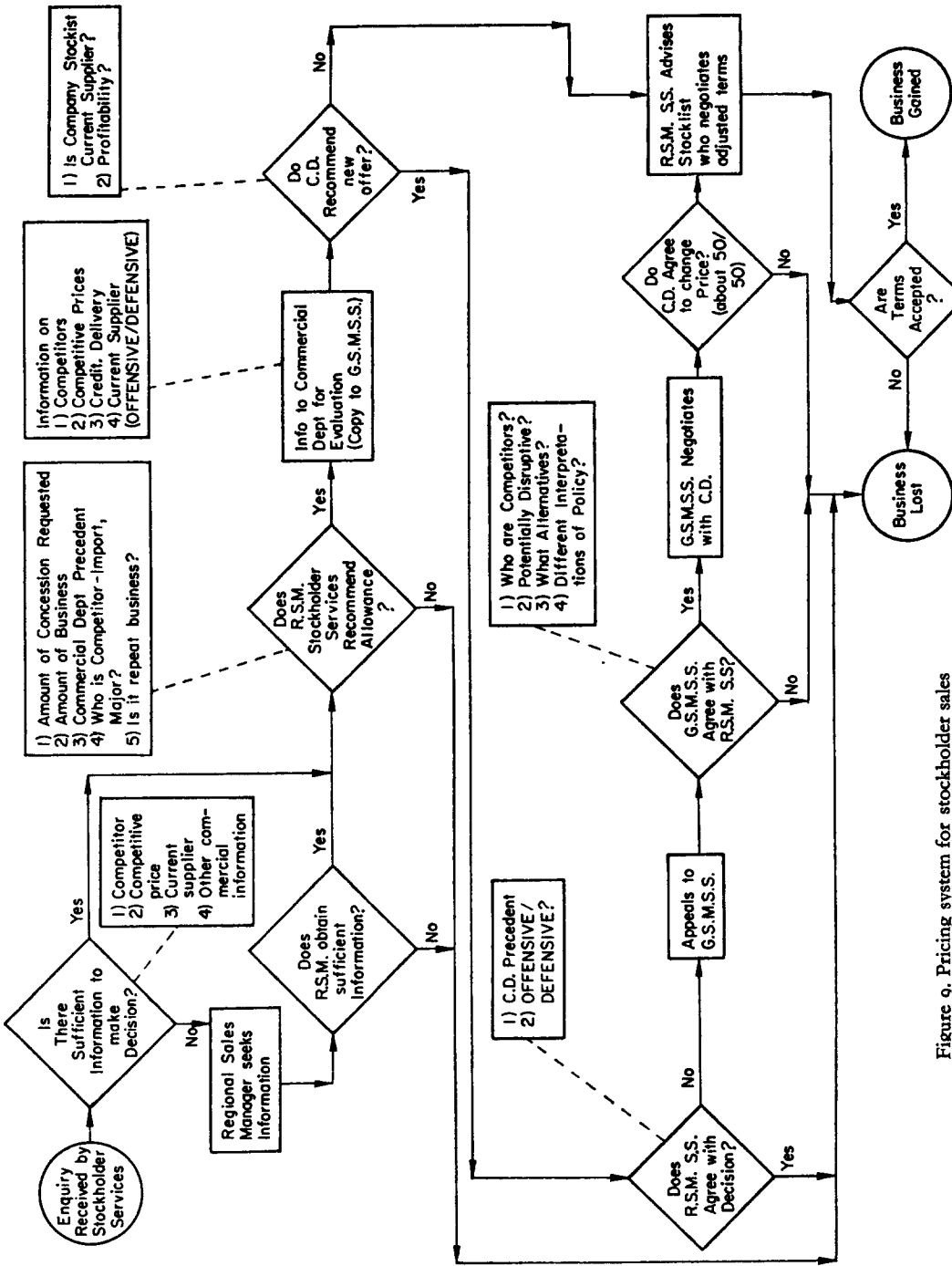


Figure 9. Pricing system for stockholder sales

and indirectly advising its competitors that it is segmenting the market, reduces the probability of downward price movements.

Stockholder sales. All stockholders receive discounts off list for the company's products in return for their services; holding inventories, customer service, etc. However, aligned stockholders generally receive greater discounts than non-aligned stockholders.

When a potential order appears that cannot be profitably obtained given the offered purchasing price, a price concession from the Regional Sales Manager Stockholder Services is requested. The Regional Sales Manager Stockholder Services first decides whether to forward the request to the Commercial Department, based on the amount of business involved, on the amount of the concession required, the nature of the competition, and recent history of Commercial Department decisions. As with direct home sales, adequate competitive information is required from the stockholder supporting the request. These decisions tend to resemble the first type just described, so the Commercial Department conveys a decision directly back to the Regional Sales Manager Stockholder Services. If he disagrees, he may request the General Manager Stockholder Services to take the matter up with Commercial Department, which is the final arbiter. The stockholder, advised of the company's terms by the Regional Sales Manager, devises appropriate terms and conveys them to the customer. This process is summarized in Figure 9.

As with direct home sales, the centralization of prices authority reduces the possibility of downward price movements initiated through haphazard stockist decisions.

Export sales. Accounting for approximately 10 per cent of the company's volume, export sales are characterized by a less rigid policy than home sales because of severe international competitive problems. For certain products, the Export Sales Manager is given 'criterion' price levels, which are minimum prices at which the products can be sold. However, the Export Sales Manager attempts to sell products at prices above these criterion levels. For other products, the Export Department employs the full list prices, with or without authorized concessions off-list much like those used in domestic business. Since most of the company's foreign business abroad is handled by agents, the Export Department assists the agents in setting their own list prices based on the prices charged by the company. When an agent requests a price concession, the Export Sales Manager can himself make a decision if the product involved has been assigned a criterion price and if the requested price is above it. However, if the current price is at or below the criterion price or if the product does not have a criterion price, then the Export Sales Manager forwards a concession request to the Commercial Department, based on the nature of the business and the competition involved. In general, a very conservative price policy is followed and the company will not undercut the

domestic producers. Further, it is concerned to offer consistent prices, in different countries, to multinational companies in order to avoid similar problems in domestic markets from the non-U.K. producers.

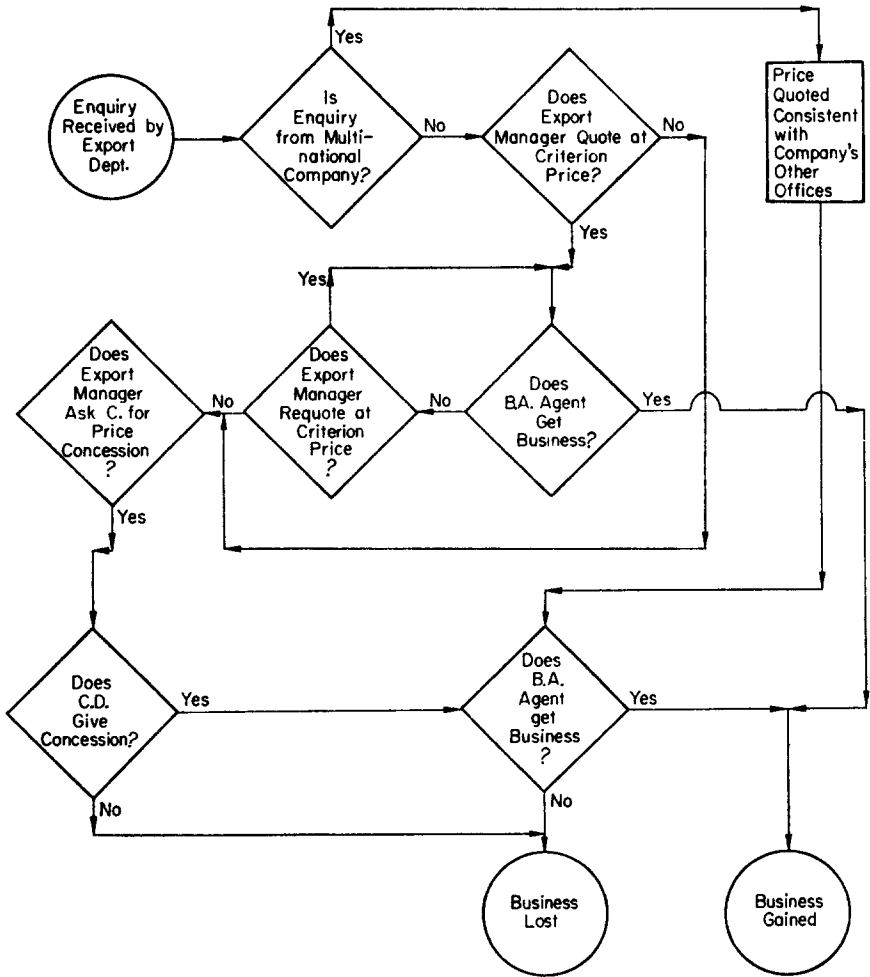


Figure 10. Pricing system for export sales

The decision by the Export Sales Manager or the Commercial Department, which is final, is conveyed to the agent who presents the customer with his offering terms. The process is described in figure 10.

The pricing system-evaluation. The most significant facet of the pricing system is the strong centralized control effected by the Commercial Department.

ment and the pushing up of highly important decisions to the Pricing Committee, chaired by the Managing Director. This procedure reflects the importance of price as a marketing variable in this oligopolistic industry which has suffered historically from overcapacity. Centralized pricing decisions within stated policy guidelines allow decisions both to be made consistently and to be seen to be consistent by customers and by competitors alike. The price adjustment procedures constitute a prototype system for day-to-day adjustment of terms of trade to changes in competitive conditions. The system is functional regardless of short-term price-volume objectives — full capacity utilization or minimum margins, for example — provided the Commercial Managers have a clear view of objectives, and provided that other elements in the organization (particularly the sales force) understand clearly the information flows required. There are problems inherent in such a system, however. For example, there may be 'short' or 'narrow' memory problems, since the files on what has transpired recently reside mainly with the Commercial Managers. When information for an investigation of price developments or patterns by product or end-use are needed, historical data are often not conveniently available — particularly to the field sales force.

The price adjustment system has relatively little in the way of marketing inputs available, particularly for end-use market conditions, and functional organization tends to foster this. As a result, price decisions are taken along a product rather than market dimension, making the firm vulnerable to price competition in selected end-uses. If a foreign competitor, for example, focuses efforts intensively on specific industries rather than on specific products, some reordering of files and pricing activities towards an end-use orientation might be needed. Further, the system may cause difficulties because of the asymmetric role of the salesman in the marketing intelligence system. Under current pricing policy, the salesman's expectations may reduce the probability of information on market opportunities being forwarded for consideration, and there is similarly a danger that lost business reporting may suffer because he does not view a given transaction as 'potential' in the first place.

Discussion

This paper describes two decision systems employed by a firm in an industry characterized as undifferentiated oligopoly; the development of terms of trade to suit market conditions and of short-term expectations with regard to volumes. The competitive situation in such industries requires that the firm organize carefully, both with regard to its planning processes and with regard to procedures which allow for adjustments to permit temporary deviation from previously developed plans.

The systems isolated for the company resemble others used by firms facing

similar market structures.⁹ They may function effectively for a wide variety of strategic postures; the stabilizing of prices (the present goal for this company), or volume maximization for certain products, product classes or within certain markets. The systems involve series of checks and balances to provide means to make use of a variety of information sources (formal and informal) as well as experience of the many individuals involved.

The broad usefulness of systems like these make it difficult to reconcile descriptions of planning systems with the canons of classical economics, particularly in terms of the taxonomy of competitive conditions. First, the price-volume solutions change almost daily, and this seems an anathema to the tidy solutions of static equilibrium or the orderliness of the time paths which most dynamic models follow towards such equilibria. As a result, these classical economic models are often rejected by decision-makers as useless in dealing with their problems. Second, the nature of the process looks as if it is running backwards in economic terms; profits and margins are goals to be met rather than resultants generated by the processes setting volume and price. Prices and quantities are both manipulated constantly, but the goals none the less tend to remain rather stable over a fairly long planning period — scarcely evidence of the short-term profit-maximizing organization at work. In short, it does not appear that these intra-organizational decision structures play according to classical economic rules. The fact is, of course, that there is no reason to expect that the systems should appear to do so. The broad goals themselves are set externally, on the basis of aggregate returns that top management expects from its general view of the business environment and the firm's capabilities, and the systems provide day-to-day implementation towards reaching these goals. Key accounts — those which yield a steady stream of orders for a mixture of end uses — are used in the decision systems as indicators to calibrate operations towards these targets, and both volume and price decisions are made iteratively. The remarkable thing about decision systems such as those described here is that they are highly functional in very different settings and for reaching rather different objectives. These include (as is described here) maintaining homogeneous commodity prices and high margins in the absence of legislation concerning price discrimination, as well as administering complex competitive pricing systems aimed at maintaining sales volume within product lines in the presence of legislation (the Robinson Patman Act in the U.S.) putting significant limitations on differential pricing to customers or end-uses. Similar systems were also found in a developing country where broad government production allocation decisions were a

⁹ Capon, N. and Hulbert, J., 'Decision Systems in Industrial Marketing: An Empirical Approach', *American Institute for Decision Sciences*, Fourth Annual Meetings, New Orleans, November, 1972, pp. 112-7.

concern of a firm competing in both industrial and consumer end-use markets.¹⁰

Study and description of such processes and systems has been suggested by operations researchers,¹¹ but there are few published reports of such studies, whether one searches the economic, operations research or marketing literature. This is probably due to the extremely labour intensive methodology involved. None the less, we believe a number of benefits flow from such analyses.

1. *Training and Teaching*

The decision process flow charts provide a convenient and graphic way of depicting how the organization makes certain kinds of decisions. As teaching devices for management trainees or other students, these descriptions provide a useful understanding of how decisions are actually made, what formal and informal communications patterns exist, *etc.*

2. *Information System Development*

Developing more effective management procedures requires a good understanding of these sorts of decision processes, as well as the operating goals of the firm. The descriptions provide a sound basis from which to begin to develop information system support for management decisions.¹² Whether such development proceeds toward computerized management information systems, or toward improving the performance of the existing system, decision descriptions provide a means of identifying key points of leverage and proceeding in a manner most likely to be acceptable to line managers.

3. *Model Building*

A strong case can also be made for the development of a decision process model as the first stage in model building effort to provide the *ceteris paribus* decision against which the new model can be tested on historical data, thus reducing the risk of modelling decisions or processes incorrectly or in a way which does not correspond to the process in which the model is to be embedded.¹³

4. *Public Policy*

The development of appropriate public policy is greatly facilitated by in-depth knowledge of competition in such an industry and decision system

¹⁰ Farley, J. U., Howard J. A. and Hulbert, J., *op. cit.*, Farley, J. U. and Hulbert, J., 'Market Planning in a Brazilian Multinational Firm', *Working Paper*, Columbia University, 1973.

¹¹ Churchman, C. W., Ackoff, R. L. and Arnoff, E. L., *Introduction to Operations Research*, New York: Wiley, 1957, p. 74.

¹² Farley, J. U., Howard, J. A. and Hulbert, J., *op. cit.*

¹³ Howard, J. A. and Morgenroth, N. M., 'Information Processing Model of Executive Decisions', *Management Science, Series A*, Vol. 14, No. 7, March 1968, pp. 416-28.

analysis for the type of firm discussed in this paper can provide valuable input for decision-making. For example, the elaborate price setting procedure represents a very functional adaptation to a difficult environment, and the fact that the readily observable list prices may be sticky in no way reflects the state of competition in the industry. Cognizance of such procedures can help the formulation of public policies to meet social goals without unfairly or unwittingly penalizing the firms involved.

5. *Organizational Analysis*

Extending decision process methodology from the individual decision-maker¹⁴ to the organization provides for a new type of organizational analysis.¹⁵ Recent developments applying graph theory to decision networks¹⁶ suggest the possibility of building organizational typologies based on decision processes.

¹⁴ Cyert, R. M. and March, J. G., *A Behavioral Theory of the Firm*, Englewood Cliffs, N. J.: Prentice-Hall, 1963; Clarkson, G. P. E., *Portfolio Selection: A Simulation of Trust Investment*, Englewood Cliffs, N. J.: Prentice-Hall, 1963.

¹⁵ Howard, J. A., Hulbert, J. and Farley, J. U., 'Planning and Feedback Responses to the Market: Behavioral Perspectives on Marketing Information System Design', *Working Paper*, Columbia University, 1972.

¹⁶ Bettman, J. R., 'A Graph Theory Approach to Consumer Information Processing Models', *Management Science*, Vol. 18, Part II, December 1971, pp. 114-28.