

MARKET AND MARKETING RESEARCH

1. Introduction

Market and Marketing Research involve techniques used to secure and analyze information about markets, products, technology, customers, competitors, acquisition targets, etc, in order to support short-, intermediate-, and long-term planning. Key elements of a research project include defining the problem, data gathering, analysis of data, and presentation of findings. This work may be done in-house, but is often contracted to outside research companies. Outside firms can provide expertise that is not present within a company; can conceal the company's interest in evaluating certain markets; and can provide an independent, nonbiased view of the market, eg, the future potential for a new product.

For a market research project to be successful, it is essential that the purpose and scope be clearly defined at the outset and specific information goals established, as well as an understanding of how the information will be used and in what forms the conclusions will be presented. The level of effort, duration, and cost of a research project should correspond with the importance of the strategic decision it supports.

Market research is a long established technique used to secure data for management to use in its decision making, which may be short, intermediate, or long term. Some market analysts use the following time frames: short term, up to 18 months; intermediate term, 18 months–5 years; long term, 5–10 years. In general, short-term market research is synonymous with sales analysis and is used to assist the sales manager in setting goals, measuring performance, and giving the production department operating targets.

Intermediate- and long-term market research has as its objectives the quantifying of markets for a particular chemical in terms of tonnages, growth potentials, general location of markets, competitive factors, and the impact of existing or potential government regulations on the market.

Marketing research, as compared to market research, is more directly concerned with identifying existing or potential users of a product, their present sources of supply, the nature and duration of any contracts that exist between producer and buyer, competitors' strategies in product development and pricing, requirements for facilities and personnel to compete successfully, and the status of competition from producers in other countries. It may involve benchmarking one's own company against competitors. Also, government regulations involving production and use of chemicals, their transportation, and disposal of wastes and by-products are researched, since these have a marked influence on the profitability of most chemical process industry operations.

Market research studies usually originate in the sales or marketing groups of a company. As a general rule, the sales analysis or short-term-type study is done by in-house personnel, often on a continuous basis. Field sales personnel are often used to assist the market research group in securing data. Long-term market research studies may originate in sales or marketing groups if the company already produces the product. If a new product is involved, the study may originate in the research and development group or at the corporate planning

level. Marketing research studies usually originate in the higher levels of management, eg, general manager or vice president. This is especially true if the proposed study is for a product new to the company.

Selection of an in-house group or consulting firm to do a market or marketing research study does not follow any set pattern. In some cases, an outside consulting group is retained to do an independent study of an area already researched by an in-house group. Most often the consultancy is unaware of the prior in-house study, and its report is used as a check study or an assurance to management that its report made a proper assessment. This is particularly important if the investment in the new product is substantial.

Use of consultants to conduct chemical market and marketing research studies began in the early 1950s in the United States and grew rapidly during the mid-1960s. In the 1990s, there were at least 50 well-known consulting firms in the United States performing this function for individual clients or on a multiclient basis. Some smaller consultants specialize in niche markets that require special technical and marketing expertise and the use of these specialized consultants is appropriate for special projects.

Western European chemical companies were slower in adopting market and marketing research tools to assist in their operations and planning. A few large companies such as ICI, Bayer, Hoechst, and Solvay were using the techniques in the late 1950s, but not until the early 1970s did European chemical companies use market and marketing research studies as frequently as their U.S. counterparts.

A company decides to use a consultancy for a variety of reasons. The most frequent motivations are desire for a study to be done anonymously in order not to disclose its interest to existing producers or customers; the company is unfamiliar with the geographic area or the product line; it lacks technology and/or industry contacts; an independent opinion is wanted without any chance of bias or preconceived ideas; the company is raising capital and wants to show the lender or underwriter an independent report; the in-house market or marketing research group is overloaded with work or the company does not have an in-house group; or an "insurance" study to compare against their own work.

2. Sales Analysis

It is axiomatic that sales analysis depends on detailed records of sales of a specific chemical to a specific company. Paramount to the success of such studies is the existence of data recorded on a systematic and continuous basis. It follows that these studies are done best by an in-house staff on products already produced by the company. However, on occasion, a product new to the company can be studied by the in-house group with the assistance of their field sales force. For example, a producer of polypropylene could use its people to secure data on the consumption of other thermoplastics by their customers. Such an exercise might identify opportunities for a new producer, but a more detailed marketing research study would probably be done before entry into the new product area was made.

2.1. Methodology. All internal sales and purchase records are computerized. This makes their retrieval and manipulation relatively quick and easy. In practical terms, a company can follow the trends in its markets on a monthly or quarterly basis. Changes in customer patterns in terms of quantities, grades, or payment alert management to seek causative factors and take appropriate action.

2.2. Use of Results. Sales analysis data are used in many ways by company management. The results are most useful in production planning, particularly if grade differences appear to be in the offing, and in assuring that adequate supplies are available for sales. Inventory control, raw material procurement, technical service requirements, and trends in accounts receivable are beneficiaries of good sales analyses.

3. Market Research

Market research in the chemical process industries differs sharply from consumer market research primarily in the so-called universe aspect. In industry studies, the universe is quite small compared to the consumer market. For example, in some industrial markets five customers may use 80–90% of the total production of a given product. There are also other important differences: “industrial marketing research pays a great deal of attention to market size and potential estimation, and relatively little attention to psychological market segmentation. Industrial market demand is derived demand. As such, it is more volatile than consumer demand. As a result, industrial marketing research shows a greater concern with business and economic conditions, raw material prices, and inventories. Industrial market demand also results from group-buying decisions to a greater extent than does consumer market demand. Organizational factors play a key role in industrial buying. Consequently, industrial buying behavior research tends to focus on different issues and to employ different research procedures than those that typify consumer research” (1).

3.1. Methodology. Practitioners of chemical market research develop individual styles and techniques. However, four elements are essential to every useful study: defining the problem, data gathering, analysis of data, and presentation of findings.

Defining the problem is often overlooked. When it is, the final report is often useless. In-house groups are sometimes given vague generalizations as the basis for a study. It is incumbent upon the researcher to meet with the people requesting the study and with the executives approving the study to ensure that each party understands what is wanted. The better the guidance that the study users can give to the market research staff, the better the study. For example, the client requesting the study should state clearly what data are required, why they are needed, what will be done with the results, and what corporate decisions may be made as a result of the study. If the results of the study will be used to justify a large capital expense, then the study should be done in-depth to support the potential investment. Armed with this knowledge, the market research staff can plan its program properly for in-house and external interviews, search of secondary data sources, and other steps basic to a study.

If a consultant is hired to do the study, it is equally important for the client to inform the consultant of its need in detail. Since the consultant usually does not have daily access to the client as the in-house group does, it is more important for the consultant to have an accurate statement of the client's problem and needs.

Data gathering usually consists of using both primary and secondary sources of information.

Primary sources are usually the existing or potential users and/or producers of the product under study. Field work or interviews with these respondents is best done by personal meetings. Such meetings permit the interviewer to gauge the reaction of the respondent to a particular question, to encourage the respondent to check their records, or to contact other people in the company, provide other industry contacts. Often a walk through the plant reveals useful facts, eg, number and source of tank cars on a siding.

Unlike consumer market research, chemical market research interviewers rarely use a printed questionnaire. Instead, a dialogue is sought between the respective parties interested in the same subject. There is no hard and fast rule on whether to make appointments or risk cold calls. Each practitioner must decide which course should be followed, taking into account the time and budget parameters of the study. Usually, a few key interviews in a given geographic area are scheduled and other calls are made depending on the available time.

Telephone interviews are often substituted for personal visits or are used to supplement such visits. They do not equal personal visits, but are useful if only a few questions are involved or if time and cost parameters preclude extensive personal field calls. Time and cost factors have led to a decline in the number of personal calls made by companies or consultancies in their market studies.

Telephone interviewing by its very nature implies a cold call at what may be an inconvenient time for the respondent. To overcome this limitation, some market researchers send a brief letter or e-mail to the respondent outlining the subject for discussion and why the respondent will benefit from the discussion. A suggested time for the actual call is indicated. This technique has yielded good results in many studies. In some cases, questionnaires are e-mailed and/or an exchange of e-mails is substituted for a telephone interview when the respondent is hard to reach, in an inconvenient time zone, or will not schedule an interview, and time limitations are a factor.

Experience is the key element in successful market research interviewing. A successful practitioner knows which companies and individuals are usually receptive to inquiries, which respondents have proved accurate in the past, and which have usually been misinformed or deliberately misleading. In the latter case, the researcher should try to determine the reason for this; if successful, an important clue may be found for the final evaluation. Researchers also face the problem of weighing the opinions of different respondents in the same company with those of respondents in other companies. Judgment and experience are the only criteria that help in this difficult task.

Protocol problems may exist for market researchers in a company. Often company policy dictates that any call on a customer requires the agreement of the sales department and the presence of a sales representative at the actual

meeting. Similarly, if calls are to be made on suppliers, purchasing department approval and attendance are often necessary. These rules can delay or lessen opportunities for a useful dialogue, but their existence must be recognized and coped with in the field.

The number of calls to primary data sources can range from 5 to 500 or more, depending on the subject, the type of data needed, the degree of accuracy required, the time–cost parameters of doing the study, and if the data sources are local or globally based. Again, judgment and experience are important to a market researcher. It is easier to guess at the number of companies and who they are than it is to guess which people or job titles should be contacted. Often, the larger the company, the greater the number of people who must be contacted in order to develop any useful data. It would be foolhardy of a market researcher studying the existing or future uses of a particular plastic in automobiles to contact one person at General Motors and conclude what GM will do. Recognition of the various centers of decision making in large individual organizations develops slowly, but the experienced practitioner has learned the hard way that casual approaches often yield incomplete and even misleading reports. An analysis of hundreds of market research studies on specific products reveals that the average number of company contacts is 50–60 and the number of persons contacted is 75–150.

A company's website can provide information about its operations and products, as well as product literature, financial data, names of key management individuals and other related information.

Secondary sources of data are useful when they exist. Databases of published information have been assembled in open or proprietary on-line databases. Market researchers can tap into proprietary databases, provided their company buys the service. Open databases include governmental, industrial associations, where the use is not restricted to subscribers. Proprietary databases include LexisNexis, Dialog's Profound service, CNI, Hoovers, etc. These databases can be searched on-line and save the market analyst many hours of work by providing current information and potential industry contacts. The services also provide much of the general sociopolitical-economic background needed, such as petroleum prices, government regulations, foreign competition, etc. Some magazines will allow subscribers to search archives for specific topics.

Most databases secure their information from printed sources. On occasion, however, a subsequent letter to the editor of a publication by a company mentioned in the article will point out an error. Unfortunately, these corrections are not always picked up by the respective databases that entered the initial data.

It is estimated that >6000 databases exist either as online or portable types, eg, CD-ROM. Of the total, only ~60 primarily cover chemicals (2).

There is also a growing number of specialized databases available from industrial related organizations that have data on specific topics such as CFC Replacement, effluents and pesticides, environmental chemical data, etc. These are usually available on-line or on CD-ROM or can be directly downloaded from the source.

Secondary sources also may exist within a company or consulting firm. These sources are usually unpublished reports or raw data collected at a prior time for another purpose.

Mail surveys are rarely used in chemical market research studies. However, they can be useful if the right conditions prevail. For example, if only a few questions requiring simple answers are needed from a large number (>500) of respondents, a properly designed mail questionnaire usually generates an acceptable return. On average, the returns are 25–40% of the number mailed, but some returns of 90% have occurred. Mail questionnaires can often be used as a screening device to identify possible respondents for follow-up telephone calls or personal visits when the market researcher is studying a totally new universe. This is especially true if the product under study is bought by many small users.

Record keeping is an essential requisite of good market research. In the chemical field, call reports or visit reports are usually written by the interviewer and become part of the report in some cases and certainly should become part of the company or consultant files for future reference. A call report should record all information that is discussed in the interview; the analysis of the data for consistency and accuracy is done later. Obviously, the call report serves a valuable purpose in the analysis and writing stage. Some market researchers have also found that cross-referencing call reports over a period of time allows rapid identification of the respondents who have demonstrated the greatest ability in forecasting their company needs and/or the needs of their industry.

There are seminars and short courses on the methodology of chemical market research. One of the most specific is the Commercial Development and Marketing Association's (CDMA) Basic Market Research Short Course (for more information go to <http://www.cdmaonline.org>). Other courses for developing research techniques include Society of Competitive Intelligence Professional's (SCIP) seminars and those offered by consultants providing techniques for research in various specific technical based markets. Reference 4 is a useful primer, but there is no substitute for actual fieldwork experience, facing varying degrees of suspicion by the respondents, to hone the practitioner's skills.

Multiclient studies have proliferated on a global basis since the first generally recognized study of this type done in 1952 on polyethylene by the Roger Williams organization. There are directories of available multiclient studies that can direct the researcher to a source, eg, *FINDEX-The Directory of Market Research Reports, Studies, and Surveys* (<http://www.csa.com/csa/factsheets/findexo.shtml>). Multiclient studies can have budgets of \$50,000–250,000 or more and can require the equivalent of several work years by the researchers.

Consultants, such as Charles River Associates, CMAI, Colin A. Houston & Associates, Inc., Kline & Co., Nexant-Chem Systems, Philip Townsend Associates, Inc., Stanford Research Institute (SRI), and Strategic Analysis, Inc. are a few of the many companies that prepare such reports.

Large consulting firms, usually identified as management consultants, often prepare individual client reports for chemical companies. These consultancies include Accenture (formerly Anderson Consulting), Deloitte & Touche, McKinsey & Company, KPMG International, etc.

A multiclient study may serve many useful purposes to company management. It may act as a primer for intensive study of a narrower part of the market,

a guide to deciding whether to expend R&D effort in the field, or a guide to deciding whether to acquire a company already in the field. The independent study can also resolve conflicting opinions within different departments of the client company. Finally, the cost of a multiclient study is usually lower than the cost of a comparable study by a client's in-house personnel.

3.2. Costs. There are two cost elements in doing marketing research studies: professional charges and out-of-pocket expenses. The actual cost of any study is entirely dependent on the number of interviews and the type of interviews. In practice, a 50-person interview study will cost \$50,000–90,000. However, if an \$80 million investment is involved, the market study is cheap insurance.

3.3. Analysis of Data. A veteran practitioner of chemical market research likened this step to the assembly of a jigsaw puzzle. There are many pieces of unequal size and importance that must be put together to make a picture understandable to everyone. Call reports, secondary data inputs, experience, and judgment are the tools used by the market researcher to analyze the data, reach conclusions, make recommendations, and write the report.

Additional resources for data analysis are found in educational centers such as the Marketing Engineering program from the Institute for the Study of Business Markets (ISMB) at Penn State. Various executive leadership programs are also offered at major academic institutions like Harvard, etc. Some of these include information on data analysis.

Both novice and experienced market researchers face the same problems at the outset. Two problems usually arise: certain pieces of desired information are lacking, and respondents contradict each other to a significant degree. Missing information can usually be obtained by follow-up telephone calls to the original respondents or new respondents. Of course, if highly proprietary information is being sought the chances of success are slim, and the researcher must resort to judgment based on experience or the counsel of others.

Clarification of contradictory opinions also can be obtained by follow-up calls. It has often been found that if one recontacts a respondent and bluntly says that others have contrary opinions, the respondent will answer by giving the basis for their opinion or changing it.

However, the market researcher has to form an opinion based on all the data. Various methods exist for manipulating the opinions, facts, and numerical data into forecasts and conclusions. Techniques in use include statistical analysis, correlations with external factors, correlations with other products, and informed opinion.

Statistical analysis can range from relatively simple regression analysis to complex input–output and mathematical models. The advent of the computer has broadened the number of tools a researcher has to manipulate data. However, the results are only as good as the inputs. Most veteran market researchers accept the statistical tools available to them, but use the results to implement their judgment rather than uncritically accepting the machine output.

Market researchers conducting sales analysis usually have an excellent record of accuracy over the short term. This is a result of good data, good judgment, and the easier predictability of events a year ahead rather than 3 or

5 years ahead. In the case of a completely new product, the first year or two can be difficult and the analyst either too optimistic or too conservative.

Correlation of markets for a product with external factors is a relatively quick and easy method of analysis, useful if the markets are correlatable with factors such as population, gross national product (GNP), Federal Reserve Board (FRB) index, etc.

Correlation with markets for other products is particularly useful for a new product. For example, market growth history of an older product (nylon) can be plotted on a graph to predict the probable growth for a newer product (polyester fibers). Data for both products may be plotted on the same chart, though not necessarily to the same scale and with the time scale shifted to bring the respective curves in parallel.

Informed opinion is a nonmathematical technique that is often called blue-sky estimating. The two terms are not necessarily synonymous. Informed opinion may be the consensus of people inside the company, along with or without outside opinions. Such a consensus can be broadened into the Delphi technique, which uses a sequential series of questionnaires submitted to a panel of experts who have little or no contact with each other. Blue-sky answers are akin to the informed opinion except that they usually consist of subjective speculation by experts in a confined 1-day meeting in which each participant knows the views of the others.

3.4. Presentation of Results. A wide variety of procedures and techniques are used to present results of market research. The technique used varies by type of study, by the source of the study within a company, and from company to company. In the broadest terms, both written and oral reports cover almost every possibility.

Written reports, within a given company, are often prepared to a prescribed format. In some cases, brevity is the criterion, and management requires a single-page summary report. In other cases, a diagrammatic scheme is used in fold-out form of roughly desk-top size, and all pertinent facts are presented. Some companies have two reports prepared: a detailed presentation for reference, and an executive summary of one-to-eight pages abstracted from the detailed report.

Oral reports usually involve a MS PowerPoint presentation. It has been found that more executives will attend an oral report presentation than will read a 100-page written report. Combinations and variations of oral and written reports are also widely used. For example, both consultants and in-house groups often present a brief oral executive summary with or without visual aids several weeks in advance of the written report.

Oral presentations are most effective if the presentation is designed to include information of direct interest. Management executives are more interested in the long-term impact on costs, sales, and profits. Sales and marketing personnel are more interested in products, competitive advantage, and sales forecast, while a technically based audience wants technical details on the process, equipment involved, etc.

3.5. Use of Results. Market researchers are occasionally disappointed in the use made of their reports. They cite instances where action contrary to their recommendations is taken, often with discouraging results; or where no

action is taken, and another company successfully takes advantage of the opportunity. It is good practice for the researcher to follow up a report and try to determine if management is using it in making decisions. Of course, a researcher must recognize that management may have compelling reasons for not following the report recommendations. In some cases, the reasons can initially only be divulged to top management. For example, negotiations may be underway for an acquisition in the market under study or the company may have a temporary cash flow problem.

4. Marketing Research

Marketing research functions in some chemical companies have been either completely abandoned or have been integrated in corporate planning groups or become part of the marketing function. Some of these activities are beyond the scope of normal marketing activities. These include assistance in the market development phases of new product introductions, searches for unfilled needs in products or services that their company may be able to meet, and searches for new uses for existing products. As in market or marketing research studies, the methods used in such search studies require contact with a broad spectrum of people in a diverse range of companies. In these studies, however, the initial work is usually qualitative in nature. The researcher strives to get as broad of an exposure as possible in the hope that this yields a few recurring ideas or suggestions to be studied later if they appear to be promising opportunities. In searches for unfilled needs or new uses, it is not uncommon for the success ratio to be 1 out of 50.

New product development programs present another type of challenge to the researcher. Often the researcher has no guidelines for evaluating the new product and must formulate a unique plan for developing enough information to construct a matrix that would show the risks and rewards of the project. A researcher must also be aware of the thinking and plans of top management and must have an understanding of its plans and directions in order to make logical and reasonable decisions involving new-product development. Reference 5 presents 10 commandments for new product development.

A complete marketing research study should include an assessment of the company's internal capabilities; manufacturing (is the technology compatible with current technology), sales (are sales representative currently calling on companies that could utilize the new product), marketing (can the potential marketing programs become an extension of current programs), technical service (is the present technical service organization organized to handle this new product), etc.

4.1. Methodology. The methodology previously outlined for market research studies is applicable to marketing research studies. However, many more elements must be considered, especially in the realm of strategy factors. Methodology for marketing research studies differs most from market research studies when the researcher evaluates the competitive forces at work and formulates a marketing strategy.

Competitors usually are readily identifiable. Their current product lines, their recent and current pricing policies, and their recent and current marketing practices are also usually discernible. Much of this information may be obtained from the company's website. However, predicting their future products and policies and their response to a new and aggressive competitor poses a significant challenge to the skills of the researcher. An exhaustive study is necessary to secure even faint clues as to the competitor's future actions and, of course, most markets surveyed have several entrenched competitors. The researcher pursues many avenues of inquiry; among them are existing or potential customers for the product, engineering companies and equipment suppliers specializing in plants for the product under study, financial analysts, and raw material suppliers. Usually, only a few clues are found and the experienced researcher has to make a judgment even with gaps in knowledge. One of the most difficult aspects of such inquiries by an in-house group is that every competitor quickly is alerted to the interest of the researcher's company. Thus, in many cases, companies retain a consulting firm for this type of study. Consultants often can secure a bit more information on these sensitive subjects, provided the respondents know them and trust their discretion.

As a general rule, marketing research studies involving comprehensive coverage of competitive firms requires personal contacts. Telephone inquiries usually are futile unless the respondent is a long-standing contact, and mail surveys are generally unsuitable.

4.2. Costs. Since much more personal contact work is required, the cost of marketing research studies is significantly higher than the cost of market research studies. Also, the advisability of using the most senior personnel raises the cost. It is not uncommon for in-depth marketing research studies to cost \$50,000–200,000, depending on the complexity of the subject.

4.3. Analysis of Data. Again, the basic techniques outlined earlier for market research studies apply to marketing research studies. However, in the realm of competitive forces and the formulation of strategies, the pragmatic judgment of the experienced researcher is essential. In most cases, the researcher does not have hard data to draw on. Instead, to some degree, a series of mental images of the principal competitors has been formulated indicating their probable response to new developments or competitors in a given market.

Elements that the researcher evaluates about competitors include plants, processes, raw material costs and availability, distribution channels, product development skills, service facilities, personnel, pricing policies, eg, does the competitor lead or follow?, and practices or concessions to secure and hold large customers. All of these factors are weighed and then the researcher decides on a strategy for the company.

The classic strategies are well known: acquisition, internal development, licensing, and joint ventures.

As a general rule, acquisitions are considered for established products with above-average growth potentials. Often, entry by acquisition is more timely and profitable than internal development and subsequent plant construction. Following the latter course might take 5–10 years, during which time the highest return on investment (ROI) is lost.

Internal development is usually recommended if the company has a unique process or product for an evolving market or a unique, less expensive process for an existing product. Licensing is resorted to when entry is desired and no suitable acquisitions can be found, but a licensor of a suitable process exists.

Joint ventures are recommended if the respective companies have complementary strengths. For example, one may have the process, the other the raw materials, a strong position in the market, or an appropriate geographic location.

Finally, the researcher must consider the kind of strategy that best fits the company, taking into account management, financial, marketing, and technical resources.

4.4. Marketing Strategy Factors. Of the elements mentioned earlier as factors in determining strategy, several deserve more detailed discussion: pricing, distribution channels, applications research, technical service, and concessions to customers.

Commodity Versus Specialty. It is useful to divide the products of the chemical industry into two broad groups: commodity and specialty. Commodity chemicals imply those produced in large tonnages. Although this is usually true, a more useful criterion is that a commodity chemical is used for its specific chemical structure, which can be specified, and that the material available from every producer is essentially identical.

Specialty chemicals, however, differ in that they are used for their performance properties and usually are not specified chemical entities. Products from different suppliers usually differ somewhat, and free interchangeability is not always possible. Special chemical systems also exist in the market and these are formulated products that contain both commodity and specialty chemicals.

Management skills that are successful for commodity chemicals may fail for specialty chemicals and vice versa. A simplified comparison of these two types of chemicals is pertinent and illustrative.

Production Requirements. Production of commodity chemicals usually requires large dedicated plants, generally in continuous operation and often with a proprietary process. A basic raw material position is preferred and is sometimes required. Specialty chemicals, on the other hand, require small- to medium-sized batch-type plants with inherent flexibility. A basic raw material position is rarely required.

Marketing Requirements. The primary portion of commodity chemical output is often sold on long-term contracts. Selling and service costs are minimal. For specialty chemicals, service and selling costs are likely to be high.

Prices. The price of commodity chemicals is based on cost of production, capital needs for expansion, and the ratio of supply to demand. Profit margins can drop under changing conditions, and unit price tends to be low. Specialty chemical prices vary widely. They are based on the value of a product or system to the customer. Profit margins can usually be maintained, and unit price is normally higher than for commodity chemicals.

Research and Development. For commodity chemicals, emphasis is on the improvement of plant operation and reduction of production costs. For specialty chemicals, emphasis is on assembling a staff capable of quickly identifying and solving a customer problem under the existing plant conditions and operating procedures of the customer.

Capital Investment and Returns. Capital needs for commodity chemicals are usually very high, hundreds of millions of dollars being needed for many petrochemical plants of economic size. Return on investment (ROI) and return on sales (ROS) vary widely. Capital needs of specialty products are usually quite low, often ~50–60¢/\$ of sales. Both ROI and ROS vary widely, but are usually higher than those for commodities.

Management. Top management usually has financial or production orientation and interests in commodity chemicals. For specialty chemicals, top management often is entrepreneurial, versed in customers' needs and dedicated to solving customers' problems.

Experienced market researchers planning a strategy that involves acquisition of a specialty chemical company by a commodity chemical producer have to be aware of these differences. Many such acquisitions have failed over the years because the commodity company management failed to recognize or refused to believe these differences.

A researcher studying a specialty chemical business or a specific specialty chemical company should pay particular attention to these rudiments: innovative talents, service facilities and performance, marketing abilities, and responsiveness to customer needs. Of these, the last may be the key criterion in most cases. A company that frequently is first with the solution to a customer's problem (even if the solution is sometimes less than perfect) usually holds the customer and a dominant market share against future competition.

Finally, a researcher must assess how the differing personalities and practices of the company for which the study is being done compare to those of the specialty company. If conflict appears likely, the researcher should discourage the acquisition because it probably will fail to meet its goal.

Pricing. Chemical pricing has always been a complex subject, but rapidly escalating raw materials costs, costs of meeting government regulations, inflationary pressures, existence of competition on a global basis, and excessively high costs of capital give management more problems than ever.

In the past, commodity chemicals were generally priced on the basis of ROI. Capital cost was the most critical item, and those elements that are related to capital cost were the principal factors in the selling price (excluding raw material cost in some cases). On this basis, a satisfactory ROI resulted in acceptable values for other criteria such as ROS or sales margin. Many analysts favor ROS as a benchmark for comparison because it is up-to-date and simple and because it is increasingly difficult to determine a true ROI based on what profits might be on plants built under inflation and expensive capital and construction costs.

Historically, in the commodity chemical business the newest and largest plant has been the lowest cost producer. Under an inflationary economy, the newest plant is usually the highest cost producer unless it features a unique process with significantly higher product yields and/or lower production costs. Often in the past and in some current situations, the newest producer, having the lowest cost plant, buys a position in the market by lowering the price.

Pricing of specialty chemicals and specialty chemical systems is, as noted, based on value to the customer. The elements of raw material and production cost enter into the producer's calculations, but extra emphasis must be given

to applications research and service costs with minimal attention in most cases to capital costs.

The pricing of a new chemical that will compete against other chemicals does involve the usual cost elements that set the price. However, it has been shown that an empirical approach may be of value. One empirical approach is the exclusion chart (6,7) developed in 1979 and modified several times over the years. The chart indicates the approximate volume that existing chemicals used for the same function have achieved at their price. There are exceptions where the new chemical can command a higher price and achieve comparable volume because it possesses a unique property.

Distribution Channels. Most commodity chemicals are primarily sold by the producer to a relatively small number of very large users. However, producers of commodity chemicals also utilize distributors to reach small volume users. Distributors buy in bulk and repackage or resell in smaller amounts to a broad spectrum of users. Distributors profit by the difference between their bulk cost and their LCL (less-than-carload lots) sales plus a commission from the producer, which may be as high as 15% of the bulk price, but is more often 5–10%.

Distributors operate on an industrial and/or geographic basis. The industrial group is especially successful in selling some types of specialties and many commodities. Geographic distributors usually handle a wider range of products from many suppliers and are more proficient in selling commodities rather than specialties.

A researcher formulating a strategy for a particular company must determine what portion of the planned output will be sold by its sales force and whether distributors or manufacturers' representatives might be beneficial. If it appears that a distributor or agent is needed, a separate evaluation of the capabilities of representative companies or individuals should be made.

Applications Research. Specialty chemical producers devote more of their time and costs to applications research than do producers of most commodity chemicals. As noted earlier, the most successful specialty chemical producers have been those companies that are able to respond quickly to customer needs and problems under the conditions found in the customer's plant. This entails having, at the specialty chemical plant, equipment and procedural knowledge that closely approximate those found among customers. Tests can then be run and a solution to the problem or need may result. If successful, even in part, it can be brought to the customers and tried there. In practice, of course, each customer's plant has some variables that make a single answer or product quite unlikely. Fortunately, slight modifications by the supplier will often solve the next customer's problem.

Commodity chemical producers have varying records of performance in applications research. It is usually high on the priority list when the product is still evolving, eg, low density polyethylene in the late 1950s and early 1960s. In times of pinched profit margins, these services often have been dropped, sometimes to be reinstituted, especially if completely new uses appeared.

A researcher planning a strategy must determine if a commitment to applications research is required. If so, the cost of facilities and personnel and the time required to assemble these must be calculated and included in the overall cost of entry.

Technical Service. Technical service usually occurs at the customer level, in contrast to applications research that occurs at both producer and customer locations. Often the field sales force functions as a quasitechnical-service group backed up by specialists operating from a corporate location. In the commodities, technical service is usually found where polymers are involved. In specialties, it exists over a broader spectrum of producers and users. As a generalization, technical service more often functions to quickly solve an operating problem that arises on a given day; applications research usually involves solving problems that arise because of basic changes in the procedures or formulations used by the customer.

A researcher planning strategy must determine whether commitment to a technical service facility and personnel is required. If it is, the cost of this commitment must be determined and included in the overall cost of entering the product field.

Concessions to Customers. A researcher formulating a strategy for a client company must take into account any special situations that may exist between a seller and a buyer for a given product. These arrangements may arise for various reasons that can be entirely legal. Long ago reciprocity arrangements were the subject of federal government examination and blatant cases were banished. However, favored relationships do exist and must be searched out and evaluated.

If two or three of the principal customers are unavailable to a new supplier, the problem of selling becomes more acute. In fact, if a significant portion of the so-called merchant market is unavailable to a new producer, entry into the field could be disastrous. Special arrangements can arise because of the proximity of supplier plant to user plant, raw material availability from one firm to the other, common financial ownership to some degree, toll arrangements, etc.

4.5. Presentation of Results. As in the case of market research reports, there are multiple techniques for informing management of the results of a study. Because the marketing research study is usually more complex and more detailed, a series of reports or presentations may occur, including some or all of the following: overview oral report to top management; overview, but more detailed oral report to individual departments or divisions; brief written reports for top management, highly visual in nature; brief written reports for division heads; and a complete written report for reference.

4.6. Use of Results. Since a marketing research study is often part of a total feasibility study, the results are usually evaluated by management and a decision is made as to the corporate position. It is incumbent on researchers to determine if the recommendations made will be considered. On occasion, middle and top management personnel have ignored the marketing research report recommendations and serious problems have arisen. Marketing research personnel are not omniscient, but they have to defend their conclusions and recommendations with authority in the overall corporate decision-making process.

5. Purchasing Research

A relatively new, but growing, responsibility for some market research practitioners is purchasing research, which uses most of the procedures previously discussed, but has a different objective, ie, ensuring the availability of raw materials at competitive prices for 3 or more years ahead. Historically, purchasing agents in large chemical companies always practiced an informal type of market research. However, the shortages and price escalations that followed the October 1973 oil embargo led to the adoption of more formalized purchasing research in many chemical companies and this practice continues.

Hardly a raw material used by the chemical industry has been unaffected by the continuing ripple effect of on-and-off inflation. Raw material prices have not risen evenly. Shifts in relative prices of competing materials continue to occur. Dealing with these shifts is a significant challenge to market research and chemical buying personnel. It must be stressed that a total view of prices, availability, and competing demands is now required and developments must be constantly monitored.

Of course, some differences in methodology exist between purchasing research practices and conventional chemical market research. For example, the analyst must be in continuous contact with the operating departments of the company to keep informed of their raw material demands for 5–10 years ahead. Recognition must be given to the life cycle of the company product line. Thus if the product line is primarily one of mature commodity chemicals, growth in demand is unlikely to exceed 5%/year. However, if the product line includes a number of new products in the early stages of their life cycle, growth of 20–25%/year is quite possible, albeit from a rather small base tonnage.

Reports in purchasing research usually differ from conventional market research reports. In many companies, a purchase profile report is prepared. It shows concisely the existing vendor capacities for the raw material, planned expansions or new producers, demands for other uses, and demand within the analyst's company. In some cases, future product demand is forecast by surveying the major customers for anticipated finished product demand. In some cases, the report includes a world supply and demand balance. A key objective of a purchase profile report is to make the buyer as well informed as the marketing manager of the seller. If this is achieved, the buyer can often secure a beneficial purchase contract.

Key contents of a purchase profile report for a specific chemical are identity, location, financial strength and capacity of primary vendors; expected additions or deletions of capacity and their timing; captive use–merchant supply status of each vendor; pricing history; pricing influences (feedstock, energy, etc); demand by use and anticipated growth; and demand in the purchaser company up to 5 or 10 years ahead.

Company practices differ in who does purchasing research and how it is done. Several patterns are evident. The chemical buyer is responsible for preparing the purchase profiles, possibly with in-house library assistance. Market research analysts are assigned to the purchasing department and prepare some or all of the profiles needed. Outside consultants are used to

prepare some of the purchase profiles or as a check on internal procedures and conclusions.

There is a difference of opinion as to whether a chemical buyer or purchasing-research analyst should be product or division oriented. Those who favor product orientation claim they achieve a broader and deeper understanding of the outlook for the chemicals they buy and this leads to sound purchasing strategy. Proponents of the division orientation claim that the product-oriented analyst has too many chemicals to follow (up to 100 specific chemicals in some companies with 10–15 as principal purchases). If, instead, division needs are paramount in the mind of the analyst, more profitable buys can be made. The weakness of this latter argument is that in multidivisional, multibillion dollar chemical companies, this division-oriented analyst may have as many chemicals to follow as a product-oriented counterpart.

Competitive uses exist for almost every chemical a purchasing department buys. Often the demands of other uses and users are larger and influence supply and prices. Therefore, it is necessary to monitor these uses and especially to determine whether alternative materials might come into use.

6. Competitive Intelligence

Some market and marketing analysts in the chemical and chemical process industries are doing competitive intelligence work. This function has its own professional organization, the Society of Competitive Intelligence Professionals (SCIP), and it has >3500 worldwide members (15–20% of the members are outside of the United States) largely from nonchemical businesses. Competitive intelligence work requires a constant monitoring of announced and rumored developments, analyzing this information and preparing actionable recommendations to remain competitive. It is used to seek out emerging technologies that may impact on some operation of a company and affect its competitive standing.

Competitive technology intelligence (CTI) is used to monitor technologies operating globally to produce consumer and industrial products including some in the chemical process industries (8). Competitive intelligence techniques are also used in benchmarking. This involves comparing one company against other companies to determine if the company is ahead or behind in technology, marketing, R&D, customer service, rapidity of introducing new products, etc. It is also being used to develop market and marketing research information that may indicate forthcoming acquisitions, alliances, and changes in a competitor's corporate structure.

The gradual, but continuing, reorganization of many chemical companies began in the late 1980s. One of the groups that have been affected is staff personnel in the marketing research group, which has led to the origin of some new consultancies or the addition of the released analysts to existing consulting firms. The continuing trend has been for market research functions to be downsized and the function absorbed by corporate planning, market managers, and other staff personnel. It is uncertain as to when or if the internal marketing research groups will resume studies.

7. Market and Marketing Research Organizations

Market research in the U.S. chemical industry began to be formalized as early as 1940. In 1945, the Chemical Market Research Association (CMRA) was formed with 75 members. In mid-1965, it was renamed and became the Chemical Marketing Research Association to reflect the broadened function of its members. In 1990, the CMRA was again renamed, becoming the Chemical Management and Resources Association and had ~1000 members.

The CMRA then defined its purposes to be “to promote the growth and development of marketing management, business development, business intelligence, and planning in the chemical or allied process industries through industrial marketing or business–market research; to provide continuing education and foster the development of those so engaged; to contribute and make available to the public, information in the field of chemical and industrial marketing, management, and business research; to cooperate with government officials in furthering the national welfare, and to carry out such activities recognized as law for such organizations” (9).

The CMRA and the Commercial Development Association (CDA) merged in 1999 to form the new Commercial Development and Marketing Association whose vision is to be “the world’s leading professional organization dedicated to fostering, promoting, and sharing business practices for long-term growth and value creation in the chemical and allied industries”. Its mission is to be the forum for networking, learning, and sharing best practices in business development and marketing for the chemical and allied industries (10).

In Western Europe, a similar pattern of evolution began in the 1960s with informal meetings which were formalized in 1967 when the European Chemical Marketing Research Association (ECMRA) became a division of the European Association for Industrial Marketing (EVAF). The EVAF was later renamed the Federation of European Marketing Research Association (FEMRA) and the ECMRA subsequently became known as the European Chemical Marketing and Strategy Association (ECMSA). It currently has ~180 members.

In Asia, the Asian Chemical Marketing Research Association (ACMRA) was organized in 1987 and is still operating on a limited basis.

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H. JAMES BIGALOW

Colin A. Houston & Associates, Inc.