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Marketing Information Systems: Uses in the *Fortune* 500

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How are the marketing executives of the Fortune *500 using their information systems? A new study reports on the relative importance of marketing research and intelligence, as well as system use by management level, function, and marketing-mix ingredient.*

It has been more than fifteen years since the concept of a computer-based management information system (MIS) was ushered in with the third generation of computer technology. Since that time, the interest in MIS has ebbed and flowed with successes and failures as firms sought that single, integrated information system. What at first seemed to be a panacea for many managers[1] later proved to some to be only a mirage.[2] Pioneering organizations took their licks but gained valuable experience. This experience, combined with improvements in both computing equipment and programming languages, has enabled many firms to achieve successful management information systems.

Marketers were among the first to grasp the significance of the MIS and identified their own special subset—the marketing information system. Much has been written about marketing information systems since Kotler talked about a "marketing nerve center," and Cox and Good recommended an implementation plan.[3] Descriptions of such systems came in the form of narrative and graphical models that explained how firms should construct and use their marketing information systems.[4]

The Concept

The marketing information system is a concept. The existence of a

separate system for any functional area of a firm would undermine the attainment of an integrated management information system. Rather, the marketing-information-system concept simply recognizes that a logical, rather than physical, subset of the MIS should be aimed at meeting the information needs of marketing managers.

There has been more interest shown in marketing information systems than in comparable systems in other areas—such as finance, production, and personnel. This extraordinary interest is based on two basic characteristics of the marketing function—its importance and its complexity. As firms in increasing numbers adopt the marketing concept of customer primacy, the importance of an efficient marketing system is recognized. The marketing information system is seen as a major step toward an integrated marketing system. Additionally, because of their semistructured nature and the lack of control over the environmental elements, marketing problems have offered difficult challenges in MIS design. Problems in other areas of the firm, mainly production and accounting, have a more internal focus and also lend themselves more easily to quantification. Compared with production and accounting, marketing is practically virgin territory in terms of unrealized information systems potential.

The Framework

There have been myriad marketing-information-system models postulated in the literature. However, after these models have been sorted and classified, it is clear that there are only three basic groups. Brien and Stafford see the systems being employed to develop marketing programs, King and Cleland stress strategic planning, whereas Kotler, McLeod, Montgomery and Urban, and Crissy and Mossman emphasize decision support.[5] These models and others that have been formulated offer different ideas of how such systems should be constructed, and their role in the management process.

The models do, however, offer several basic similarities that are illustrated in a composite form in Figure 1. The models generally show an information processor that is an interface between the marketing manager and the firm's environment. Data is gathered from the environment using marketing research, intelligence, internal accounting, and government-affairs subsystems, and this data is placed in a data base. Computer programs, including data-base management and statistical-analysis software, transform the data into management information. The computer programs are designed to facilitate solution of problems relating to each ingredient in the marketing mix—product, price, place, and promotion. The manager uses the information output to make decisions and affect programs

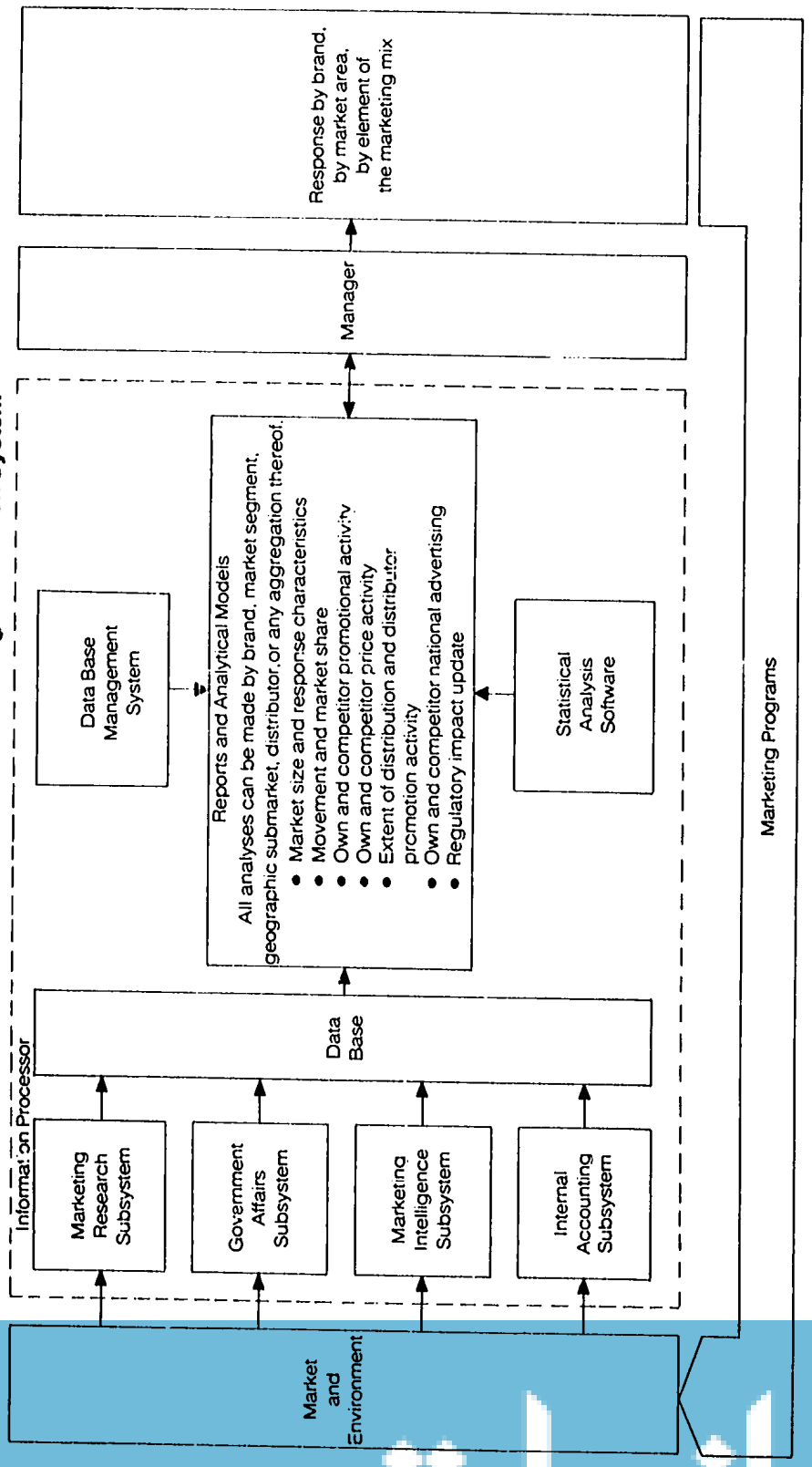


Figure 1. Framework of a Marketing Information System

that initiate marketing activities aimed at the customer. System framework conforms to a closed-loop system design, with the information processor and the manager functioning as the control mechanism.

The purpose of these normative models has been to describe an ideal structure. But how closely do these models compare with the systems that firms have developed? To shed some light on this question, a mail survey was conducted in 1980 of 300 vice-presidents of marketing of *Fortune* 500 companies; 111 usable questionnaires were returned. It would be expected that the survey firms would be farther along in their information systems programs than smaller organizations, simply from the standpoint of resource availability. Therefore, the study only reflects the status of marketing information systems reported by these larger firms.

Data Gathering

The *Fortune* 500 managers were asked to rank the three data sources (internal accounting, marketing research, and marketing intelligence) in order of importance to their information systems. Fifty-nine managers (53 percent) felt that accounting data were most important, whereas thirty (27 percent) selected marketing intelligence. Only twenty-one (20 percent) regarded marketing research as most important. The strong showing of accounting data was expected, since information systems still rely heavily on the accounting data base. The stong showing of marketing intelligence compared with marketing research was not expected. Although marketing intelligence does not receive the emphasis in the literature that marketing research does, marketing intelligence represents a well-used data-gathering alternative for these larger firms.

Marketing Intelligence—When one speaks of a marketing information system, a computer-based system is implied. But a computer processor is not an absolute requirement, especially for handling marketing intelligence. Such information does not readily lend itself to computer storage—much intelligence is transmitted by word-of-mouth, and the format of one message or record tends to differ from another. Eighty-six managers (77 percent) reported that marketing intelligence material is routed to managers with a need to know, but in only seventeen (15 percent) of these firms is the computer involved in the routing.

Many of the reporting firms have offices that are primarily concerned with the collection of environmental data. Kotler recognized the need for such an office and named it the marketing information and analysis center (MIAC). These environmental-data-gathering offices

of the *Fortune* 500 firms collect customer data (seventy-six firms or 68 percent), data on competitive activities (fifty-five firms or 50 percent), and government data (fifty-three firms or 48 percent). It is somewhat interesting to note that only 50 percent of the responding firms collect data on competitive activities.

Firms reported four sources of data on competitive activities. Salesperson call reports represent the most popular source (seventy-nine firms or 71 percent), but annual reports and purchased reports (seventy-eight firms each) are close behind. Clipping services are employed in sixty-six firms (59 percent). As shown in the exhibit, these data are not computerized in most firms. Twenty firms (18 percent) enter salesperson call report data into their data base, and thirty-five firms (32 percent) use the computer to store purchased report data—probably because many such reports are in computer-readable form, such as magnetic tape.

Computerized Environmental Data—Although most of the marketing intelligence data are not computerized, much of the data gathered by internal accounting and marketing research can be found in the computer memory. The managers were asked whether their firms maintained data in a computerized data base describing activities of customers, potential customers, competitors, the federal government, and the national economy. Eighty-six firms (77 percent) keep customer data in their data base, with separate files established for potential customers in twenty-six firms (23 percent). Thirty-seven (33 percent) report computerized competitive data, but only seventeen firms (15 percent) enter data describing the federal government into their computers. Almost a third of the firms (thirty-six) have computerized data describing the national economy.

Some of these data types can be gathered more easily than others and this explains, to a degree, the difference in responses. Customer data can be gathered most easily as a result of sales transactions recorded by the internal accounting system. National economic data can be purchased in computer-readable form, as can some data on competitors. Data on potential customers and the federal government are much more difficult to acquire.

Information Outputs

Managers can receive information from the computer in three basic ways: by periodic report, by response to data-base queries, and by output from simulations by mathematical models. These outputs have traditionally been printed by computer line printers, but more frequently are being displayed on cathode-ray-tube terminals or printed on hard-copy terminals.

Terminal Use—Fifty-seven managers (51 percent) responded that they have a terminal available for their use, and two indicated that such equipment is planned. While this terminal availability seems low in light of the recent proliferation of the devices, the figure is high when compared with the situation ten years ago. In a 1972 survey of *Fortune* 500 companies, Boone and Kurtz found only 10 percent of the marketing managers with terminals.[6]

Of those managers with terminals responding in the 1980 survey, almost half (twenty-five) use them on a daily basis. Eleven use them two to three times a week, three use them weekly, and four, monthly. Seven delegate terminal responsibility to their staff, and seven never use them.

Terminals are most often used to produce information output: forty-three use them to respond to inquiries, thirty-five produce reports, and twenty-nine simulate results. Two other terminal uses received frequent mention: coding programs (twenty-three reporting) and storing data (thirty-two). Several managers indicated that staff members operate the terminals, and this practice would be especially applicable to program coding and data storage. It is difficult to visualize the executives performing these tasks themselves.

Preprocessed Information—Roughly half of the firms (fifty-five) maintain preprocessed information in the data base for responding immediately to manager queries. When asked for examples of preprocessed information, the managers replied with a wide variety. The most popular was sales data, both historical and projection. Other frequently mentioned types were economic, customer, market share, distribution activity, distribution trends, competitive sales, inventory, and pricing data.

For the forty-four firms responding that preprocessed information is not available, a similar ability can be provided by use of a commercial data base management system.

Decision Support Systems

The Brien-Stafford model describes how the marketing information system can be used to develop and update marketing programs. Eighty-five (77 percent) of the *Fortune* 500 companies indicated that they have such programs, but only thirteen (12 percent) are stored in the computer data base. Eighty firms (72 percent) enter only part of their programs into the computer. This means that computerized information systems are not being used in programming marketing strategies as much as initially anticipated or intended.

When asked if the marketing function conducts forecasts that implicitly include estimates of economic trends, seventy-seven man-

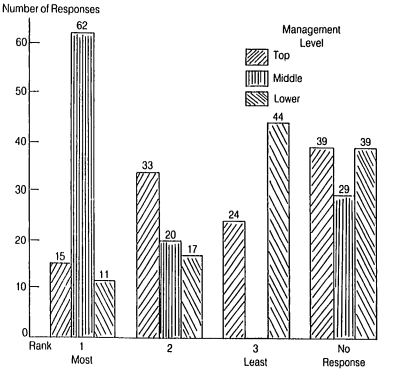
agers (69 percent) replied yes, and three (3 percent) indicated that their planning or economic research departments do it. This finding is unexpected, as descriptions of marketing information systems have not frequently included this activity. Rather, econometric forecasting has been pictured as a part of the firm's financial information system.[7] One manager responded that their forecasting was a joint marketing-finance effort.

Decision Modeling—During recent years, decision modeling has been promoted as an effective means of using the computer as a decision support system. Ten years ago the practice was very rare. In the 1972 *Fortune* 500 study, only one-fifth of the firms were using mathematical models.[8]

The situation is different today. Sixty percent of the firms use models to compute their operating budgets. This particular modeling activity, however, might be a better example of a financial information system than marketing. But there is no question about the other models that relate to marketing-mix decisions. Models are used to assist in the evaluation of new products in forty-two firms (38 percent), and in the deletion of unprofitable products on a slightly smaller scale, thirty-three firms (30 percent). Pricing strategy models are the most popular, with fifty-three firms (48 percent) reporting use. This popularity is unanticipated since this pricing activity has usually been pictured as an unstructured or nonprogrammed type of decision process. The use of modeling for this class of problems indicates an advanced decision-support-system achievement. The use of economic-order quantity models (forty firms) and reorder point models (forty-one firms) was also surprising because use was much lower than expected. In the place area, thirty-four of the firms (30 percent) reported using models to locate facilities such as warehouses or stores. Much less interest was shown in the use of similar models for optimum routing of salespersons or deliveries—only fourteen companies (13 percent). There was very modest support for decisions relating to the promotion mix with only 12 firms (11 percent) reporting use of models to assist in selection of advertising media and twenty-six firms (23 percent) using the computer to assist in assigning salespersons to territories.

Management Use—When asked if the decision models were intended for use by particular levels, fifty-nine (53 percent) managers replied yes and thirty-nine (35 percent) replied no. A rank-order of model use by management level bears out this stratification. Sixty-two (56 percent) executives indicated that models are used most at the middle level, whereas fifteen (14 percent) placed maximum use at the top level, and only eleven (10 percent) at the lower level. Forty-

Figure 2. Model Use by Management Level



four (40 percent) believed model use to be the least at the lower level. It is clearly evident that these top-level managers perceive someone else to be benefitting the most from model use—the middle-level managers. (See Figure 2.)

This ranking of model use by management level corresponds to overall use of the marketing information system. Sixty-three (57 percent) managers believe that the use is greatest on the middle level, with twenty-eight (25 percent) managers selecting the top level, and only nineteen (17 percent) selecting the lower.

This focus of information-system support at the middle level is both significant and encouraging. During the early years of the MIS, a frequent criticism was the lack of support it provided to upper-level managers. The information output of the early systems consisted mostly of periodic reports of historical accounting data, and these were of most use to managers on the bottom level. One of the *Fortune* 500 executives noted that the "top level desires a market information system," while another predicted that top level support "will change to a much higher (rank) in eighteen months."

Support for Management Functions

The use of information systems by management levels is influenced,

in part, by the functions that those managers perform. The classical management theorist, Henri Fayol, identified the functions as planning, organizing, staffing, directing, and controlling. While all managers perform all of these functions, planning is typically the key top-level responsibility, and control is the major middle-level activity. Organizing is usually done at upper levels, and staffing and directing are important lower-level duties. Therefore, if an information system is to support a management level, the system must support those functions most important to that level.

Information-system support is greater for some management functions than others, as shown in Figure 3. The executives believe that information-system support is most in planning and controlling and least in staffing and organizing. Twenty-six managers believe directing to be supported to the greatest degree. These results coincide with descriptions of MIS use in the literature.

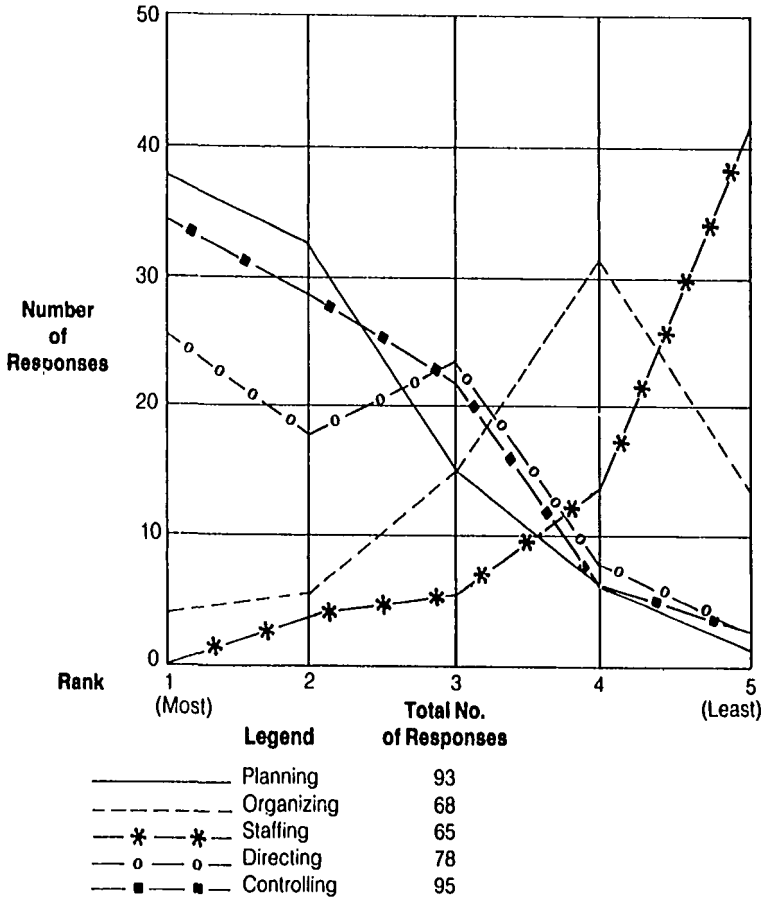
Support by Marketing Mix Ingredient—Since several of the models of marketing information systems categorize system components according to the elements of the marketing mix, managers were asked to rank the ingredients in terms of system support. These rankings indicate top support for product decisions (fifty-one first-place votes) followed in order by price (twenty-eight votes), place (seventeen votes), and promotion (only eight votes)—see Figure 4.

The poor showing of the place subsystem is surprising. More uses of the computer for making place-type decisions have been described in the literature than for any other of the mix ingredients. In the questionnaire, the term *distribution channel* was used rather than *place*. Perhaps this terminology reduced the perceived scope of computer support and eliminated from consideration those highly profitable computerized inventory and physical distribution applications.

Summary

For the most part, the survey findings conformed to what one might expect, based on the evolving literature of marketing information systems. For example, internal accounting is the most important data-gathering method, very little marketing intelligence finds its way into the computer, and data describing the firm's customers receive more attention than any other data type. Terminals are used very frequently by the managers for querying the data base and receiving reports, and decision support models are quite popular—especially on the middle-management level. It is middle management the information system provides with its greatest support, primarily because of the emphasis that has been placed on supporting decisions relating

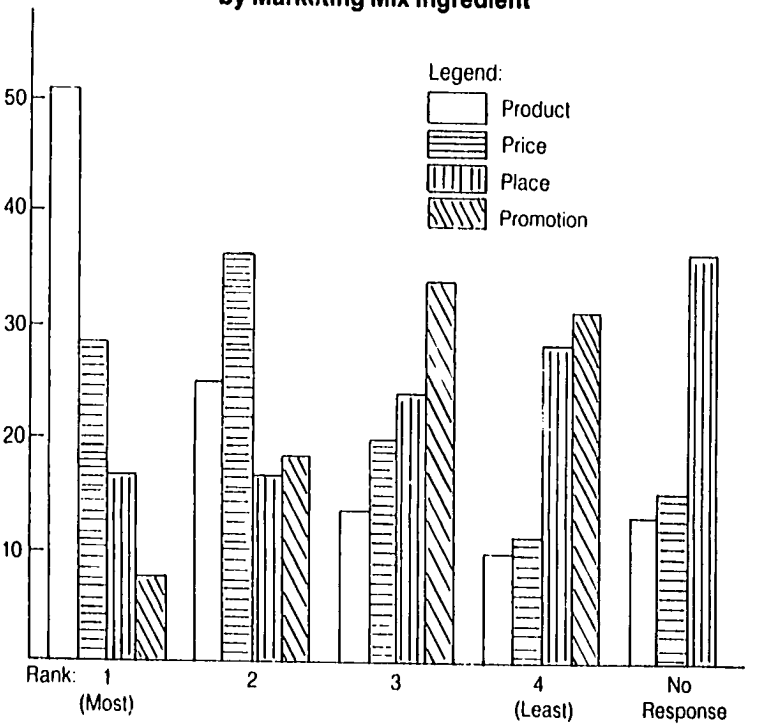
Figure 3. Information System Support by Management Function



to planning and controlling. In terms of support for marketing-mix-ingredients decisions, the information system does the best job in the product area and the poorest with the promotion element.

Quite a large number of findings were unanticipated, however. It was not expected that marketing intelligence would be a more important data-gathering method than marketing research. More than half of the firms have special offices to collect environmental data, and three-fourths route intelligence information to appropriate executives. One-third of the companies have national economic data in their data bases, and in two-thirds of the organizations the marketing function performs forecasting that implicitly considers economic trends. The involvement in decision modeling was greater than anticipated especially for pricing strategy, but modeling of place decisions did not measure up to the high expectations cultivated by the physical distribution literature. The stong information system support at the top management level and the top ranking of planning support verifies the upward and the future focus in current system designs. Market-

Figure 4. Information System Support by Marketing Mix Ingredient



ing information systems have come a long way since the early ability to support primarily lower-level control activities.

Future Direction

The trend toward marketing information systems will continue during the next decade. The few firms indicating that they have no such systems or have poor systems will be unable to continue to ignore the system's necessity. The systems of the future will undoubtedly incorporate the new developments in computing equipment, such as minicomputers and microcomputers, point of sale terminals, and graphical output devices. The equipment will be integrated into corporatewide data-communications networks, and greater use will be made of data-base management systems and query languages. The firms with functioning systems will continue to expand them, concentrating on improving the support for organizing, staffing, and directing at the lower management level. Improved system support in these areas will demand participation by management specialists who can identify specific decisions needing support, and can provide new insights to modeling and reporting methods.

Terminal use will continue to increase but not so much by the

executives themselves as by their staff. Staff members will have the responsibility of interacting with the computer both on input and output. The staff member will serve as a "gatekeeper," analyzing and interpreting system output for the executive. The importance of such responsibility cannot be overemphasized.

As the information systems become more sophisticated, new sources and forms of environmental data will emerge. It will become increasingly easy to buy competitive, government, and even customer data from firms that will gather it and make it available in a computer-readable form through subscription services.

Designers of future systems will be challenged to achieve better information support in both place- and promotion-related decisions. In the place area, emphasis will be focused on gathering the data for decisions by means of intrafirm channel feedback systems and data bases shared by channel members. Likewise, in the promotion area, improvements can be anticipated in both feedback and feedforward communications with sales offices and personnel, employing portable terminals and audio-response capability in addition to conventional telecommunications equipment.

The 1970s saw firms of all sizes and types embarking on MIS development programs. The *Fortune* 500 companies participating in this study have, for the most part, achieved those information systems. The 1980s will see these larger firms concentrate on those system parts that have proven to be the most difficult. In this respect the challenge of the 1980s will be just as formidable as that of the past decade.

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