Marketing Information Systems: A Marriage of Systems Analysis and Marketing Management

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Abstract

Synergy between information systems and marketing has stimulated interest in marketing information systems (MKIS) as a major marketing management tool. However, educators, researchers and managers are only beginning to define this field systematically. This paper reviews related literature from marketing, management and information sciences to develop a definition of marketing information systems and a model process for MKIS development. Special attention is paid to the role of marketing professionals in the development process.

Introduction

Technological advances in computer based information systems have dramatically changed approaches to marketing management. The microcomputer revolution and fourth generation languages (4GL's) brought computer capabilities to virtually all marketing organizations and continuing technology advances are moving marketing managers into the corporate spotlight by providing new tools with which to respond to market opportunities (Boone and Kurtz 1989; Churchill 1987; Kotler 1988; Kotler and Armstrong 1987; McCarthy and Perreault 1987; Robinson 1989; Rubinstein 1989). Marketing information systems (MKIS) are one such tool. This paper synthesizes literature from information systems, marketing and management to develop a model approach for the development of MKISs and to illustrate potential benefits of marketing information systems as an important applied research tool for market planning and management.

Perhaps the greatest impact of "computer" advances on marketers has been the development of "end user computing". This has often been manifest in marketing departments by personalized computer applications ranging from sales and product forecast models, to lead systems, advertising impact models and competitor monitoring systems. Unfortunately, in many cases such developments are carried out solely within the marketing department and without the formal support of the organization's management information systems (MIS) professionals. Where this occurs, the organization's marketing efforts may fail to take full advantage of the available data resources. Furthermore, systems developed on an ad hoc basis may be short lived, untested, and may fail to address the strategic needs of the organization. Worse, ad hoc developments risk misuse and misinterpretation of data and may impact on data integrity. While isolated, self-reliant marketing developments may be understandable given the dominance of accounting, production, and financial management concerns in conventional MISs (Moriarty and Swartz 1989), marketing information systems are today recognized as key competitive business tools (Eisenhart 1988; Keon 1987; Robinson 1989; Wiseman 1988; Bagozzi 1986; Sisoda 1988).

If marketers are to exploit fully modern information science technologies for the strategic benefit of their organizations, well planned systems must be developed. Such systems may involve microcomputer applications and end user development, but will certainly go beyond isolated, ad hoc systems to include linkages to central systems, access to organization-wide databases, and a team approach encompassing marketing and information systems professionals, representatives of related departments, and top management. The critical challenge for marketing professionals is to understand the processes of systems development and planning and the conceptual view of systems from the perspective of information

systems professional. The challenge facing information system professionals is to understand the requirements of marketing professionals. This challenge is particularly problematic because marketing management and decision making often require ad hoc inquiries and analyses whereas traditional MIS approaches have centered on systematic data processing and routine, fixed reporting.

The Nature of Marketing Information Systems

Even a cursory review of literature regarding MKISs reveals great variety in what is meant by "marketing information systems". Some writers apply the term to sales support tools such as systems for lead and prospect tracking, telemarketing, and customer support (Datapro Reports 1989; Dobrozdravic 1989; Eisenhart 1989; Keon 1987; Moriarty and Swartz 1989; Snyder 1988). Others emphasize market intelligence and planning (Churchill 1987; Fletcher 1988; Rubinstein 1989) or focus on formal management tools such as expert and decision support systems (Churchill 1987; Dyer 1989; Robinson 1989). All are potential aspects of a MKIS but each may be viewed as a subsystem within an integrated framework. Furthermore, the MKIS needs of a specific organization depend upon its unique circumstances, its relations with its environments and customers, and the marketing mixes and strategy which it has developed. Instead of defining MKISs in terms of specific applications, we propose to emphasize system objectives and the information needs of the organization. *A marketing information system may be defined as a formal system designed with the objective of creating an organized, regular flow of relevant information for use and analysis by marketing decision makers*. This definition is similar in content to definitions by Boone and Kurtz (1989), Churchill (1987), Cox and Goode (1967), McCarthy and Perreault (1987), and Schoner (1975).

Five aspects of the definition may be noted. First, the definition does not specify computer hardware or software. Although computer based systems will typically be used, the emphasis is placed on the provision of relevant information rather than the use of computers per se. Electronic computing techniques and software skills are of less importance than understanding marketing information requirements and decision making procedures. Second, the definition calls for organized, regular flows of relevant information. A MKIS is not an ad hoc development to serve an isolated management demand. A MKIS is created to provide predictable flows of information in terms of content, format, elements, and meaning. This characteristic separates the MKIS from primary data collection by market researchers (Churchill 1987, p. 867; Cox and Goode 1969; Nylen 1990), but primary research may provide important data that could be included in a MKIS database. Third, the information is to be relevant to marketing decisions. High level marketing decision makers must be included in planning the information requirements. These managers are an integral part of the successful system. Fourth, marketing managers are expected to carry out further analyses of the information provided by the system. The system must provide the analytical resources needed by marketing decision makers for ad hoc inquiries and analyses. These may involve statistical and mathematical modeling and qualitative analysis tools, as well as provisions for interpreting and reporting findings, drawing conclusions, and making recommendations (Bagozzi 1986, p. 271; Johnson, Kast, and Rosenzweig 1973). Finally, the definition emphasizes marketing decision making, not operational management. This distinguishes the MKIS as a planning and decision support system from logistical support systems such as telemarketing, order entry, and sales support although logistical systems may be important sources of MKIS data.

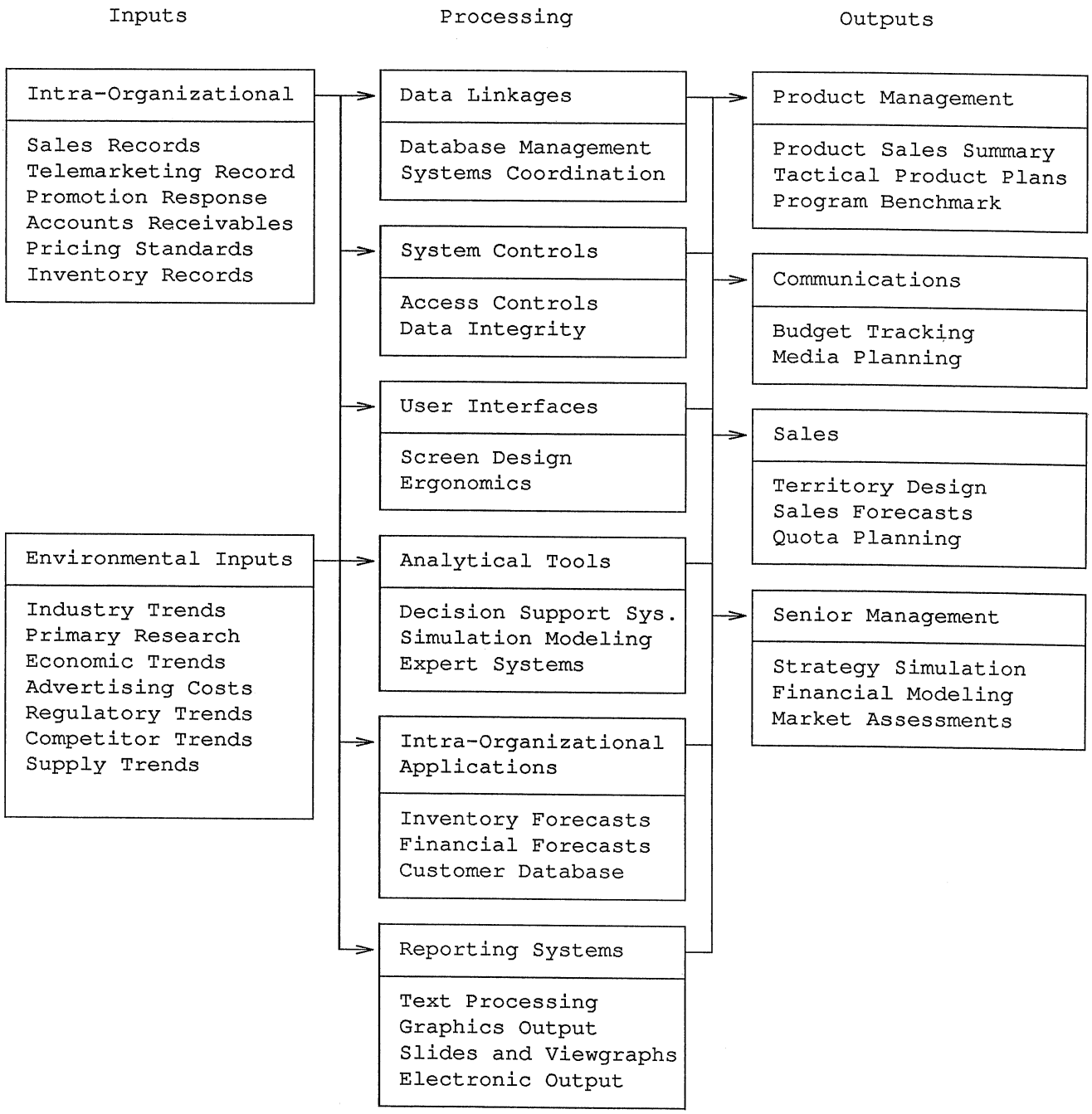
Because the MKIS is intended to transform data resources into ongoing, relevant flows of information for marketing decision making, at a broad level the MKIS will involve data inputs, processing components for transmitting and transforming data and system controls, and potential outputs applicable to management areas within marketing departments. Figure 1 illustrates these general aspects of a comprehensive MKIS. The precise elements involved in an actual system will vary with the organization.

Both internal and external data sources are included in Figure 1. Internal data resources might be sales or shipping records, cost data, product service reports, and so forth. External data resources are represented by environmental inputs such as economic and industry trend data, market demographic information, etc. Technical components include data linkages which allow data to be accessed systematically, user interfaces to allow the marketing manager to use analytical tools efficiently, analytical tools to transform data into usable information, reporting systems to assure effective managerial communication, and system controls to assure overall integrity. Potential outputs include a variety of management decision support reports and models applicable to specific marketing management areas such as product management, sales, marketing communications, and senior management.

Stages of Systems Planning and Implementation

Successful MKIS development will depend upon an

Figure 1. Sample MKIS Components

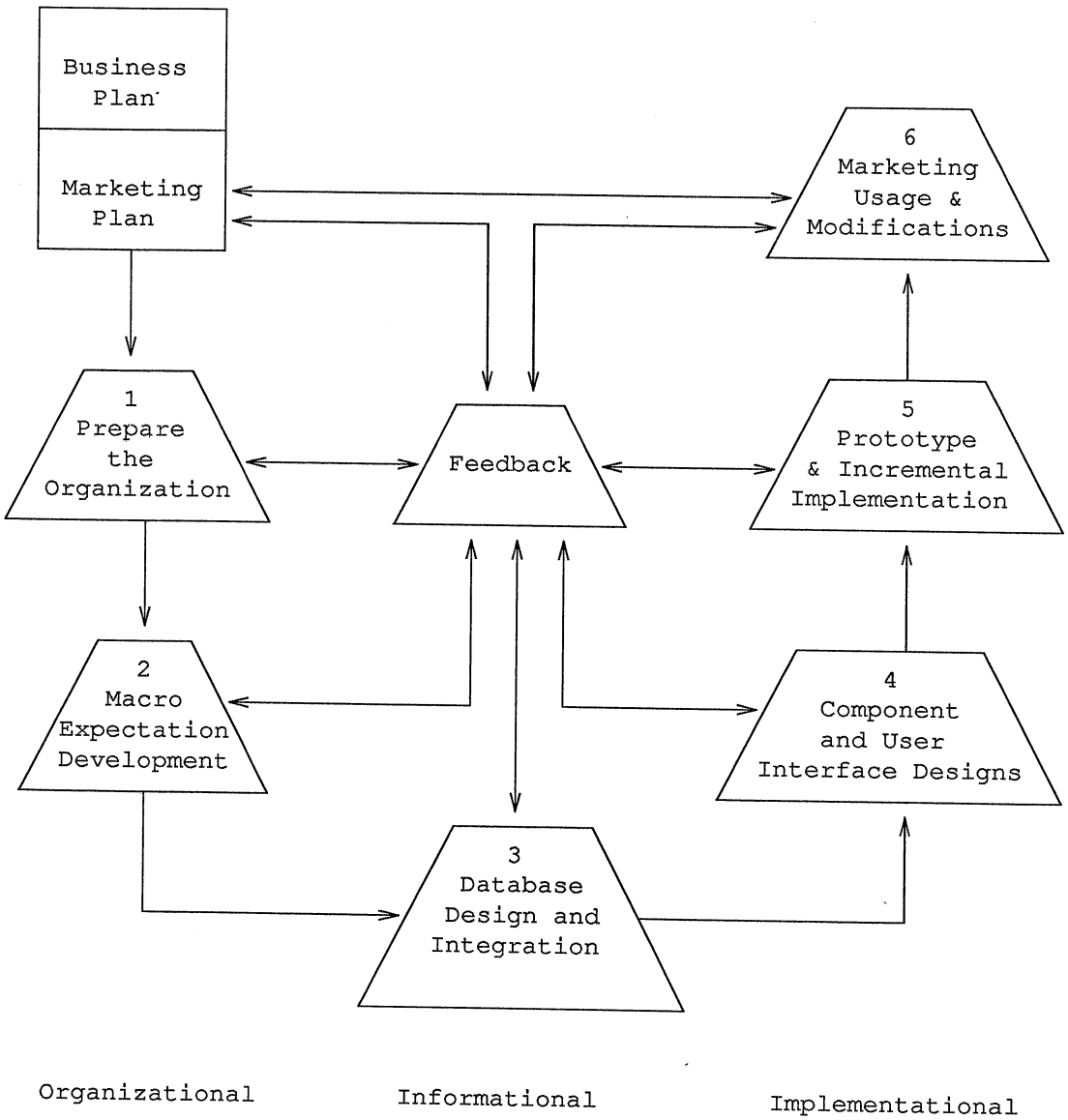


effective planning process (Cox and Goode 1967) and coordination with the organization's strategic business and marketing plans. As a key resource supporting the organization's strategic plan, the MKIS plan must consider the information systems needed to support the organization's goals and objectives at the tactical and strategic levels. This will help to assure that sales and other logistical systems will be integrated to allow all relevant internal data to be used by the MKIS. Without such planning, organizations' information systems risk evolving as independent discrete programs supporting specific operations but without interfaces to allow the available data to be used when and where needed. Worse is the situation in which marketing managers substitute piecemeal development of personal, end user modules for an effective MKIS. Such modules are often not documented, untested and involve rekeying information and so fail to assure data, programming, or process integrity.

Assuming that the organization's strategic plan and the related marketing plans are in place, six broad steps of the MKIS planning process may be delineated. The six steps are: 1) preparation of the organization (Cox and Goode, 1967) involving a) obtain top management support and commitment, b) review the marketing organization and its policies, c) establish an organization to coordinate MKIS development, and d) set organizational goals and expectations; 2) develop "Macro" specifications with senior staff and line managers; 3) design databases and the relationship of the MKIS to existing information systems; 4) specify and develop components including user interfaces; 5) prototyping and incremental implementation; and 6) ongoing usage by marketing managers. These steps are depicted in Figure 2.

The steps are not a simple linear flow. While steps should be initiated in sequence, the feedback process links each step to all other steps and to the marketing plan. Activities in later steps may yield information and ideas that require revisiting earlier steps. Even after the system is in place, changes in the marketing plan, available information, or desired analytical techniques may lead to changes in the system. Accordingly, MKIS development is not a fixed set of procedures, but an ongoing process in which formal development stages and procedures provide for stability and integrity. Methods for managing feedback and for balancing system stability and flexibility are important areas for continued study by business researchers.

Figure 2. MKIS Development and Implementation Process



Step 1: Organizational Preparation

Organizational politics, scarce resources, and management demands make obtaining top management support a critical first step in the MKIS planning and development process. This support must be grounded in a realistic understanding of the requirements, time frames, and desired outcomes. Even when systems development directives emanate from top management, top managers often do not understand the importance of their active participation. Active top management support is critical for many reasons, three stand out. First, MKIS development is expensive in personnel time and financial costs. After development has begun, these resources may be demanded for other activities. Without a clear understanding of the costs, top management may send conflicting directives which result in disruption, work overloads, and low morale. Second, when the MKIS is implemented it may change approaches to decision making and have an impact on organizational culture (Keen 1981). Because cultural change is difficult, top management's confidence in the benefits of the system must be conveyed throughout the organization. Third, the MKIS data requirements will cross departmental boundaries (Keen 1981) and top management must resolve resulting disputes.

Unfortunately, while the need for top management support is generally recognized, little is known of the process of obtaining and maintaining active top management involvement, particularly when the stimulus for change originates at the middle or lower levels of the organization. This also represents an important research area for both marketing, information systems and management researchers. The work of Daft and Lengel (1986) and Daft and Weick (1984) regarding organizational culture and managers' beliefs as to the utility of information, and the work of Hambrick (1982) regarding receptivity of executives to environmental scanning activities are particularly relevant.

The second aspect of preparing the organization is a marketing review. Because the MKIS system must provide relevant information and appropriate analytical and decision support tools to facilitate market planning and decision making, it will be necessary to review in detail the policies, procedures and decision making processes of the marketing department. This may create anxiety and generate resistance among staff members (Keen 1981). Top management may help to minimize anxiety by explaining the reason for the marketing review and the objectives of the MKIS development. Although the intention of the marketing review is to allow system planners to understand how information systems can support marketing planning and decision making, the review may lead to revisions in marketing procedures.

The third step in preparing the organization is the appointment of a team to coordinate MKIS activities. It is important that this team be led by a high level manager who has the clear confidence of top management and a firm understanding of marketing activities and strategic goals. These qualifications are more significant than expertise in computer systems. Political and resource issues require that this responsibility not be delegated to a lower level manager or to a technical manager who has narrow experience in the organization. Other members of the team should be selected from the departments that will use the system or be involved in the development process. Finally, the need for *teamwork between the information and marketing professionals* cannot be overemphasized. Members of the MKIS development team must understand one another's needs, vocabulary, and work. Formal plans, perhaps involving outside consultants, should be made for team building to remove "us-versus-them" barriers.

The fourth step in preparing the organization is the establishment of realistic expectations. Because useful systems may fail due to unrealistic expectations and fears over job change and security, it is important that both senior managers and line managers be involved in developing realistic goals and expectations for the MKIS and communicating these to subordinates. Goals and expectations should focus on the decision support needs of top management and marketing managers and on realistic estimates of the time frames and required resources, not on technological fascination or immediate data availability. . By being involved in this process early on, it is more likely that top management will remain committed and will be satisfied with the outcomes. Any tendency to glorify the benefits of an "ideal" system in order to obtain commitment and support must be avoided as must promises to incorporate each manager's wish list of desired functions.

Step 2: Developing Macro Specifications

Macro level specifications refer to broad definitions of the system requirements of the intended users. Macro specifications address requirements for planning and decision support tools such as statistical analysis systems, decision support systems (DSS) (Little 1979) and executive support systems (ESS) (Steinberg and Plank 1987; Chandler and Liang 1990) which are used by marketing and other functional departments, interfaces with internal and external data and with other systems, general requirements for user interfaces, and output systems. These issues correspond to the types of

components suggested in the center column of Figure 1.

Existing computer processes should be studied (Berenson 1969), but marketing managers also use personal decision making methods based on available information and experience. These often reflect personal style and techniques as well as formal procedures (Keen 1981). Such personalized approaches to information selection, analysis, and decision making must be considered. An effective MKIS design requires that the planning team understand how the users of the final system will interact with the applications to be developed. Because the system must be adaptable to future needs, planners must also anticipate how the MKIS may change decision making methods and how these may change during the time that the system is being developed.

The complexities of the system and the ad hoc nature of marketing inquiries may require the design team to conduct primary research into the informational and psychological methods used by marketing mangers (Van Mayros and Dolan 1988; Nylen 1990; Kotler 1966). This may involve studying issues faced by marketing managers and iteratively describing and graphically representing the decision processes until all marketing decision makers verify the technical descriptions of how decisions are made. In this phase it may be useful to have consultants conduct focus group meetings to explore the decision making processes.

Because these macro level specifications can call for extensive systems, it may be necessary for marketing managers to help the team focus on the key decision making issues and to decompose the "ideal" MKIS into feasible modules which can be prioritized for phased development and implementation. One relatively new approach to the design of databases, processes, and decision analysis methods is "object oriented design." Each object is defined as a set of attributes with prescribed inputs and outputs. Because object oriented design is a new approach to information definition, more research is needed to assess how it may be most usefully applied to large, integrated MKIS processes.

Step 3: Databases Designs

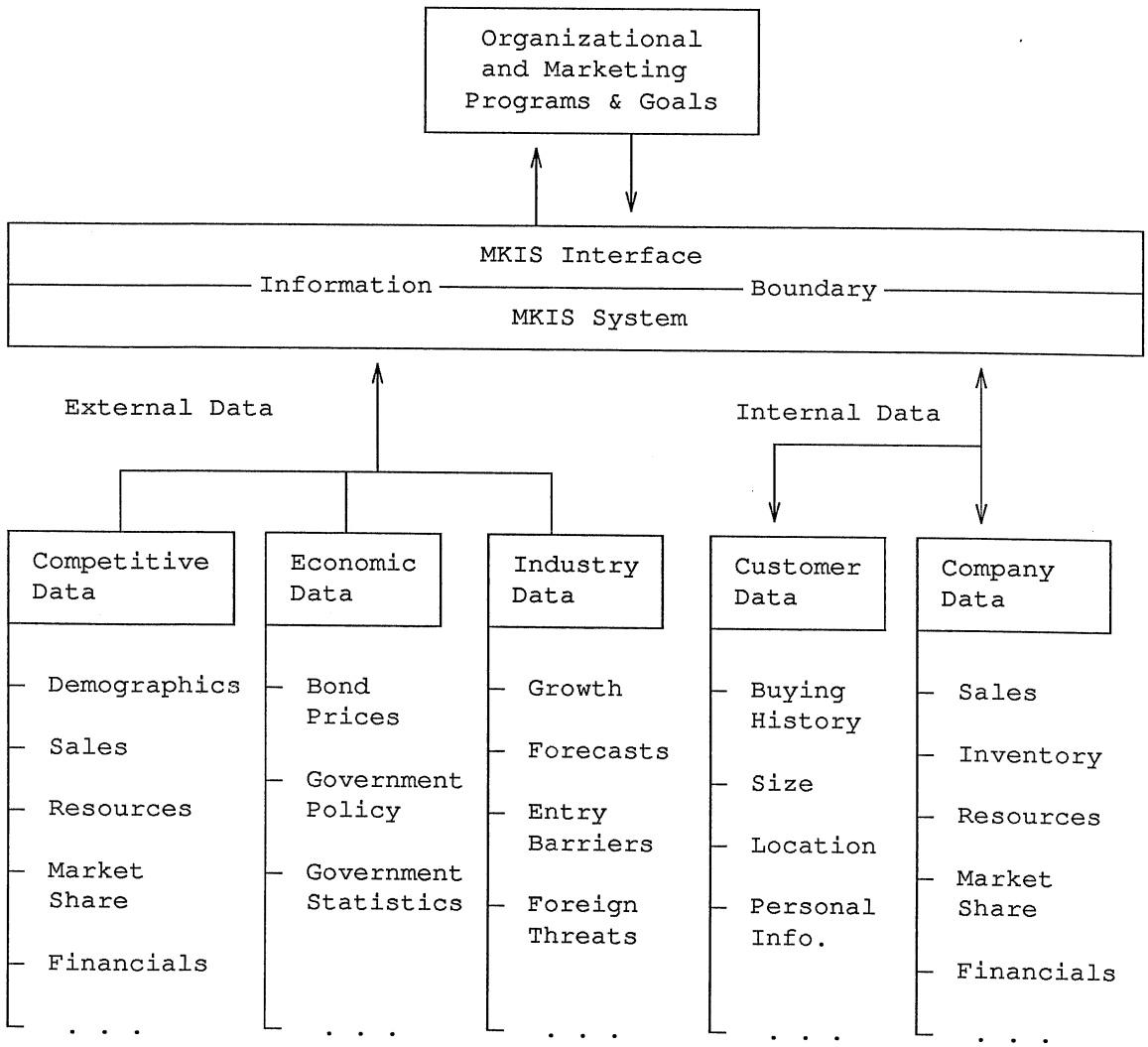
Marketing departments have complex and changeable information needs and substantial research by marketing academicians is needed to develop models of decision processes and data requirements (Nylen 1990; O'Dell et al. 1984). Because the MKIS will draw on internal and external data, the plan must provide for systematic interfaces to existing internal data systems and to appropriate external systems, and for flexible approaches to systematizing coding and entry of "unsystematic" data derived from external data sources (Buzzell, Cox and Goode 1967; Mayros and Werner 1982; Montgomery and Weinberg 1979). Figure 3 illustrates potential internal and external data inputs. The decision support components of the MKIS must be "data and software independent". They cannot be constrained by decisions involving data aggregation or elimination made for software applications which are external to the MKIS. Such changes must not lead to the failure of MKIS components.

Internal data sources may include records derived from sales and order entry systems, manufacturing quality control, advertising monitors, telemarketing response records, leads, sales commissions, inventory patterns, and so forth. The ability of marketing managers to draw on such data will require that these internal information sources be developed as "relational databases" maintained at the lowest practical level of aggregation (Cox and Goode 1967). The objective here is to avoid constraining marketing analyses to predefined categorization schemes such as geographic territories, product classes, sales teams, etc. Decision makers must be able to respond quickly to changing market dynamics and this will change the nature of analytical inquiries. The resulting requirements may make low level of aggregation, relational databases seem inefficient to business programmers used to traditional MIS approaches. Traditional approaches often use hierarchical file structures which minimize data storage and CPU requirements, and are appropriate for fixed reports and tree style searches of individual records. But, hierarchical files are inefficient when applied outside of fixed reporting and may fatally constrain the analytical capabilities required by marketers.

"Data and software independence" is crucial to the successful MKIS. If the MKIS databases and linkages to other systems are adequately specified, they will be able to serve not only marketing inquiries but also decision support systems, executive support systems and other inquiry systems throughout the organization (Hohn 1986). To assure data integrity it will be necessary to develop a comprehensive data dictionary and to plan new informational layouts and relationships to guide the creation of the MKIS databases. The resulting data sets should be stable and controlled by a high level manager. This person can serve as the MKIS administrator to assure system security and integrity should the logistical systems which will feed the MKIS files be changed in the future (Laudon and Laudon 1988).

In order to assure software independence, modifications may need to be made to the logistical systems

Figure 3. MKIS Informational Resources



which will provide data to the MKIS. This is not to say that these systems will have to be discarded or disrupted. Often the necessary MKIS database files may be created by inserting new output modules within existing logistical systems to allow these systems to record the necessary data files before discarding, aggregating or otherwise modifying data. Also, the process of defining the data needs of the MKIS may reveal opportunities to collect additional valuable data through the logistical systems. For example, a system for recording customer problems might be enhanced to include the place of purchase.

Approaches to external data may be more difficult to specify. External data are not as easily controlled as internal data and are likely to be unsystematic. Even when obtained regularly, externally derived data may be provided in printed rather than machine readable form and may frequently be qualitative rather than quantitative. Even definitions of quantitative data may be unclear and different sources may refer to items by the same names but use different definitions, if definitions are available at all. In the interest of data integrity it is necessary to specify the critical external data elements to be maintained in systematic databases. Because organizations often do not have an explicit model of external data used in market planning and decision making, the MKIS development team may be called upon to work with the marketing department, the market research group, and product managers to create an appropriate model of external information.

Step 4: MKIS Components and User Interface Designs

With the organization prepared, initial macro specifications developed, and data requirements defined, the development team may begin to specify the required components and user interfaces. Several authors have suggested approaches to identifying the components of an MKIS. Schoner (1975), taking a technological view, distinguishes application and support systems. Support systems include market research, data gathering, programming, data processing, and related activities which build the MKIS databases. Application systems include the analytical and reporting tools which draw on those databases. Such tools would include decision and executive support systems, statistical analysis systems, etc.

Other writers have distinguished MKIS components from an organizational structure view. Buzzell, Cox and Brown (1969) separate marketing management systems, marketing information systems, and marketing support systems. Kotler (1988) has suggested a similar approach. The "management system" includes organizational arrangements, position responsibilities, and planning and control procedures which will govern the system. The "information system" provides methods for the regular, planned analysis and presentation of information. The support system includes procedures for acquiring, processing, retrieving, and transmitting information.

A third approach considers the functional areas of the marketing organization. O'Brien (1988) has used this approach to suggest six MKIS functional areas; sales order processing, sales management, advertising and promotion, sales forecasting, market research, and marketing management control. Although we view the sales order entry system as external to the MKIS, O'Brien's approach sensitizes the reader to the need to consider organizational divisions which may have different data, analysis, and reporting requirements.

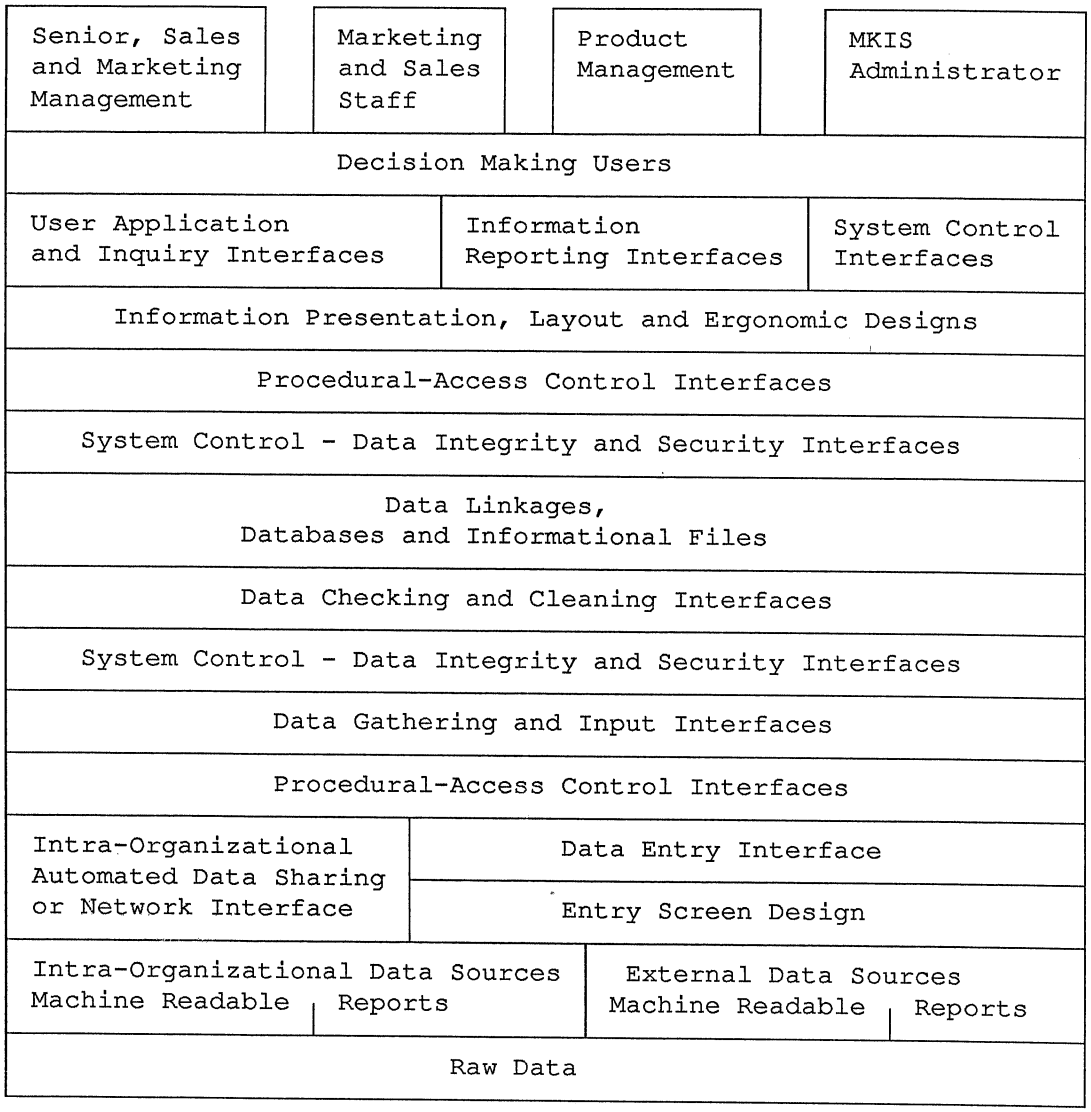
The above approaches may be synthesized in four general aspects of system components: 1) control components; 2) data acquisition support components; 3) application components; and 4) system users (including their functional positions) and user interfaces. These types of components are integrated in Figure 4. Control components address system management responsibilities and the organizational and technical systems that will govern system access, data integrity, and system security. It is useful to consider two major types of controls; system controls and procedural controls. System controls may be manual or computerized and are designed to ensure that data are entered, processed, and reported in an accurate, relevant, and error free manner. These controls include such techniques as entry logs, control totals, data item range checks, multi-dependent item record validation, and checkpoints. System controls may be subdivided into input, processing, output, and storage control methods. Procedural controls specify how personnel and related departments interact with the system with regard to data accuracy and security, and program development. Procedural controls define methods for inter-departmental data sharing, quality control monitoring, documentation, program review and approval, system backups, and data archives.

Support systems for data acquisition address the technological interfaces and personnel work assignments that allow the MKIS to draw on internal data from throughout the organization and provide for the systematization and entry of external data. These components link the organization's logistical systems to the MKIS databases. Work assignments and data entry programs for external environmental data are data acquisition support components which operate in conjunction with appropriate systems controls to assure accurate data entry.

Application components cover the range of subsystems which marketing professionals will use to access MKIS databases and carry out the necessary inquiries, analyses, report writing, and graphical displays. Forecast models, statistical packages, graphics and report generators, simulations, expert systems, and decision support systems may all be considered potential application components of an MKIS. The specific components to be implemented will be determined in the MKIS plan. Because the objective of the system is to provide information to marketing managers to support decision making, all application components must be compatible with the users for the system to be effective. Planning and development activities must consider the needs of marketing users in the functional (i.e. department) areas, and the desired user interfaces and system outputs.

Specifications of user interfaces must consider: 1) who will be the users and their functional and managerial positions; 2) how the MKIS analytical and output capabilities will affect decision making process; 3) issues related to computer literacy, fears, and resistance, familiarity with computer systems, principles of information systems, training needs, and documentation; and 4) current computer tools. Although the current tools may be manual or isolated microcomputer approaches developed by end users, these "systems" can be a good starting point from which to consider user interfaces and output capabilities. The MKIS must not be perceived as

Figure 4. MKIS Component Relationships



taking capabilities away or making work more difficult. Ideally, the MKIS will be seen as an enhancement to current approaches and developers should try to build on those methods.

User friendly interfaces that demand minimal computer literacy will enhance acceptance. Today, friendly interfaces have become synonymous with menu and icon presentation systems which allow users to carry out eclectic inquiries with minimal training. Such approaches are especially valuable since they can, if well planned, guide the analytical process. However, the underlying systems and the options presented must be sufficiently flexible so as not to constrain the user's analytical approach or decision making processes. While a totally flexible system cannot be developed, understanding the eclectic nature of marketing information analysis will help developers to incorporate software options that will meet most needs and to plan for system interfaces to special 4GL analytical and reporting tools desired by the users. With the proper data interfaces, it may often be most efficient to provide 4GL software packages for many of the desired analytical, reporting and graphics capabilities.

Step 5: Prototype Development and Phased Implementation

The comprehensive MKIS system development approach described in this paper will be an extensive,

long term effort. However, planning and development are not separate from implementation and user acceptance and while much research has explored factors affecting user acceptance, this area remains an important area of researcher inquiry. Reflecting elements of a "sociotechnical" approach (Davis and Olson 1985; Triste and Lawrence 1963; Mumford and Wier 1979; Hackman and Oldham 1980; Woodward 1965) to planning, the development procedures described in this paper not only provide for effective systems design, but also contribute organizational and user receptivity towards the new system. The procedures described thus far assure that the resulting data sets and analytical tools conform to the needs and current procedures of the relevant marketing and senior managers. Ideally the resulting system will not impose new decision making procedures and processes but will enhance the procedures in place in the marketing organization. Through participation in the planning and development efforts (Lucas 1986), marketing managers and staff have the opportunity to develop a sense of ownership of the system and become open to change. In addition, modular design and programming techniques and careful attention to prototype development, particularly in regard to user interfaces and expected outputs, will allow implementation to be phased in and interfaces may be adjusted to assure user comfort. Phased implementation has the resource benefit of allowing the programming staff to direct attention to the highest priority modules identified in the macro specification stage and the user benefit of allowing users to adapt to one new capability at a time. This will avoid overwhelming both programming staff and users. Finally, old procedures should not be disabled and the intended users of the new system should not be precluded from using older approaches. System benefits should be "sold" as enhancements that improve decision making, ease extraneous work loads and otherwise enrich job experiences.

The importance of modular designs and phased implementation should be stressed. The work of marketing planning and management must go on and many of the information systems needs of marketing managers cannot await development and installation of an entire system. Once the critical data bases have been defined, development of individual component modules may proceed independently. Following holistic system planning, the primary components needed to support marketing management can be developed and implemented first. This will provide significant benefit to marketing decision making in a shorter time frame and will allowing decision makers to work with and recommend modifications to components before additional work is done on other system modules. This will also have the social benefit of encouraging top managers and senior marketing managers to begin work with the system as "early adopters" and to produce demonstrable results and so motivate subordinates to seek greater involvement with the system (Mertes, 1981, p. 131).

From standpoints of both user acceptance and programmer efficiency, prototypes of modules, user interfaces and output samples should be developed and tested with real users early in the development process. This will allow user interfaces to be improved to assure comfortable acceptance during actual implementation. The experience of working with prototypes also allows users to clarify their needs and requirements. Such sample "systems" can alert users and developers to misunderstandings which may have occurred during the planning and specification process. After prototype testing, developers may proceed with programming actual modules to be brought on line as they become available.

Successful implementation will also require user training. Ideally, primary users of the MKIS will have been involved in the design stage as sources of information and in some cases as members of the design team. Other users will have been exposed to system modules during prototyping and testing. Nonetheless, formal training should be planned for all users to assure that system modules are well received, to set expectations, and to obtain feedback for improvements. In some cases user training may have to be carried out on a one-on-one basis. This is likely to be the case when higher level managers are involved. Adequate user training and acceptance will also require that users be provided with well developed documentation written in language which reflects their own work rather than the jargon of information systems and with integrated on-line help systems. Details of training will be forgotten, but manuals and on-line help will always be critical reference tools.

Step 6: Marketing Usage and future Modifications.

Once modules have been brought "on-line" and are being used by the marketing professionals, the implementation process should continue with formal efforts to assess user satisfaction, to identify "bugs", and to provide further training as may be necessary to support individual users. User support should be planned as an ongoing effort to be monitored by the MKIS administrator and coordinated with the professional MIS staff. Where possible, ongoing user training should be carried out by members of the marketing staff experienced with the relevant modules. Such peer support may be particularly helpful at lower management levels but may be more problematic at higher levels where personal contact

between top managers and the MKIS administrator may be needed. Perhaps most importantly, top management must not only use the system, but reference and use the products of the system developed by marketing managers and their subordinates. Indeed, if the development of specifications accurately modeled the decision processes, the analyses and other products of the MKIS should be seen as highly relevant and strongly desired. Middle managers will need incentives and one strong incentive is the knowledge that the results of the new system are in fact respected and utilized. The factors which influence managerial receptivity to staff research are an important topic to be addressed by business researchers (Deshpande, R. and Zatlman, G. 1982).

Even after all anticipated modules are in place and functioning, the system should not be viewed as final or complete. Marketing departments serve critical boundary functions which link the organization to its external constituencies. To do so effectively frequently requires adaptation to changing conditions in external competitive, technological, economic, social, political and customer environments (Montgomery and Weinberg 1979). Accordingly, marketing plans change to accommodate new markets and changing environmental conditions. With such changes may come the need to modify the MKIS to accommodate new data sources and perhaps new analytical techniques. This linkage between changeable market plans and the flexibility of the MKIS is indicated in Figure 1 by the bi-directional arrow linking the marketing plan to usage and modification of the MKIS. Recognizing the dynamic aspects of the marketing functions of organizations, information systems administrators should be prepared to accommodate justifiable changes and enhancements to the system that may be requested by marketing managers. The modular nature of the MKIS design may facilitate this flexibility, but both the marketing department and the information systems department should be prepared administratively to be receptive to changes resulting from the experiences of users and changing demands on marketing management.

Summary

Marketing information systems can be valuable resources for organizations faced with competitive and changing environments. The complexities of marketing environments often require that managers develop plans and make tactical decisions based on a wide variety of internal and external data sources, and use complex analytical procedures. As organizations grow and expand product lines, markets, and distribution channels, the need for formal analytical support tools and rapid data access increases. Information systems advances involving approaches to systems planning and development, and technical aspects of hardware and software, offer great potential for marketing professionals. Achieving this potential will require that marketing professionals work closely with the organization's information systems specialists to plan, develop, and implement ongoing systems that allow marketing managers to make the best use of available data in a timely and efficient manner.

Suggestions for Future Research

The conceptual frameworks and development processes reviewed in this paper offer a model to guide the coordinated work of marketing managers and information systems professionals. But this is only a model. Each organization must work to identify its own information needs and the procedures by which decisions are made. In addition, applied business researchers from the fields of information systems, marketing, and management must continue to explore ways to improve the processes of planning, developing and implementing marketing information systems to assure efficiency and timeliness in implementation and flexibility in ongoing application and support activities.

At various points throughout this paper we have identified important specific areas which may benefit from the attention of business researchers. These include methods for managing feedback and balancing system stability and flexibility, the process by which top management support is obtained particularly when the desire for system development originates in middle management, the benefits of object oriented design when applied to large integrated projects such as a MKIS, personnel management methods for facilitating acceptance of new systems, factors influencing research usage, and effective methods for identifying and modeling the information needs of dynamic marketing organizations. These and many other issues associated with the planning of information systems challenge both the information systems manager and the marketing manager seeking to take advantage of modern information and decision technologies. It is in these areas that business researchers may make significant contributions toward the development and design of effective information systems for marketing management.

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