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The executive summary contains the major findings on management of automated information at Headquarters, Department of the Army (HQDA), the proposed approach to managing automated information in an eleven point overall program and contains the authors' eight recommendations for HQDA to establish an information resource management program for HQDA.

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Executive Summary

EXECUTIVE SUMMARY

Information^{*} is a valuable resource of Headquarters, Department of the Army (HQDA). Specifically, information is essential to:

- . Effective planning to achieve Army mission goals,
- . Efficient execution of the plans, and
- . Appropriate feedback from the execution into the planning process.

As the recognition of the value and cost of information increases in the Army, the effective management of this resource becomes increasingly important to HQDA.

In Headquarters, DA information is often regarded as a "free good", something which can be replicated wherever it is to be used or collected whenever it is needed. However, information is costly to collect, process, store, and maintain even though such costs are not always explicitly identified.

The cost of information is particularly evident in dealing with automated systems because of the high capital investment in ADP equipment and the cost of software development. HQDA does not currently manage its automated information effectively. The result is that even though the size, number, and cost of HQDA automated information systems are increasing, Headquarters decision-makers find that they still cannot get all the information they need in a timely or consistent manner.

Managing information as an organizational resource can help HQDA identify and control the costs associated with supplying information for more effective decision-making. In the course of our study we have determined a need in HQDA for improvements in the management of its automated information. We recommend that HQDA adopt the view of treating information as a resource and proceed with the development of a program for information resource management. We believe that such a program can contribute significantly to the effective management of HQDA.

This Phase I Executive Summary outlines our findings concerning the need in HQDA for a consolidated program for information management and presents our recommended conceptual approach to managing the automated information resource. In the next section of this report we present an overview of the project goals and objectives. This overview is followed by a summary of the study findings and major information issues, a brief description of an information resource management program, and our recommendations regarding establishing such a program in HQDA.

^{*}1/In the context of this report, the term "information" encompasses both processed and unprocessed data as represented in a variety of formats and storage media.

1. PROJECT OVERVIEW

The goal of this study is to develop the policy, the concepts and directions, the administrative methodologies and procedures, and an organizational approach for use by the Department of the Army in accomplishing the management of automated information within HQDA and its supporting Data Processing Installations (DPIs). The specific objectives of this study are:

- 1) Determination of the requirements for effective automated information management among the HQDA organizational elements,
- 2) Development of an information resource management (IRM) program to manage effectively HQDA's automated information resources,
- 3) Development of an information administration structure and the necessary policies and procedures required to administer the program,
- 4) Development of a time-phased plan for implementing the IRM program.

The study is divided into two phases: Phase I - Program Requirements Definition and Phase II - Program Implementation Planning. In Phase I we have concentrated on determining the requirements for information management and have developed the conceptual framework for a program for managing the automated information resources of Headquarters, DA. In Phase II we propose to develop the program in greater detail and recommend a long-range approach for implementation.

In order to understand the impact and direction of the recommendations developed in this report, it is important to clearly recognize the limited scope of the study:

- The goal of Phase I, as reflected in this report, is the development of a concept for managing information for HQDA. In Phase II we shall develop the program in detail.
- The objective of the study is the formulation of a plan for managing automated information in HQDA, not the development of a HQDA automated management information system.
- The reviews of current HQDA operations were conducted in this study to allow Arthur Young & Company to determine what is needed and what is feasible for managing HQDA's automated information resource, not to evaluate individual systems or activities.

- . The study has been limited to automated information used by HQDA and its supporting DPIs. Our recommendations are offered with this restriction in mind.

Considering the size and complexity of Army operations, the management structure, and the impact of its decisions, the Army needs to have the best information available for decision-making. Effective management of information entails understanding what data is available, keeping track of where the data is, and knowing who is responsible for it. In large organizations such as the Headquarters, Department of the Army, this is extremely difficult. Each individual Staff Agency is capable of managing its own data, but there is no explicit management of the data that flows among the agencies. Furthermore, the individual agencies each manage their own data in different ways, making the correlation of data at higher levels difficult or impossible. Who has access to the data, who actually uses the data, under what conditions is the data valid, when can it be released by an organization, when can it be removed or changed, how can it be shared among organizations, and how much does it cost to collect, store, and process the data are all questions relevant to the management of the information resource.

Such questions are, at best, difficult and, sometimes, impossible to answer consistently across HQDA. And yet, the answers to such questions are central to information sharing, improved management reporting, and more effective decision-making. To accomplish this objective, we believe HQDA must establish an effective program for information resource management.

Information resource management is an approach predicated on the philosophy that information is a basic resource in its own right and something which can be managed effectively through the application of traditionally sound business practices. The view of information as an item of economic worth, with measurable characteristics, and which is capable of being planned, budgeted, and accounted for is fundamental to the improved management of information.

Viewing information as a resource of HQDA provides some advantages in the management of information:

- . A horizontal view of information across functional areas to maintain a HQDA perspective
- . A coordinated approach to resolving inter-organizational differences in the definition of the characteristics of information
- . The fixing of responsibilities throughout HQDA pertaining to information collection, definition, manipulation, reporting, and retention
- . A mechanism for identifying and controlling information redundancies and inconsistencies.

This view does not necessarily imply that a single person or organization should be placed in charge of all information for HQDA or that the various functional agencies should relinquish control over their individual data bases. What is implied is the need for coordination and cooperation in the management of information for the benefit of HQDA as a whole.

Exhibit 1 presents the conceptual information resource environment and identifies three communities in relation to it. The information resource management community is responsible for the definition, description, and location of the information while the information resource handling community is responsible for the hardware, software, and telecommunications involved in the acquisition, processing, and transmission of information. The information resource user community includes the mission-oriented organizations which put the information to use and define the requirements for it. This information resource environment does not currently exist in Headquarters, DA. There is, in fact, no central leadership or direction in the information management domain.

Information resource management does not imply a single, all-inclusive integrated data base of every data element used by HQDA. Such a massive HQDA data base is probably not technologically feasible nor organizationally desirable. Further, it is not necessary to the implementation of information resource management. What is necessary is the establishment of special types of data bases which contain information describing the characteristics of the individual data bases and files of the Staff Agencies. This special type of data about data is termed metadata and is essential to the management of information.

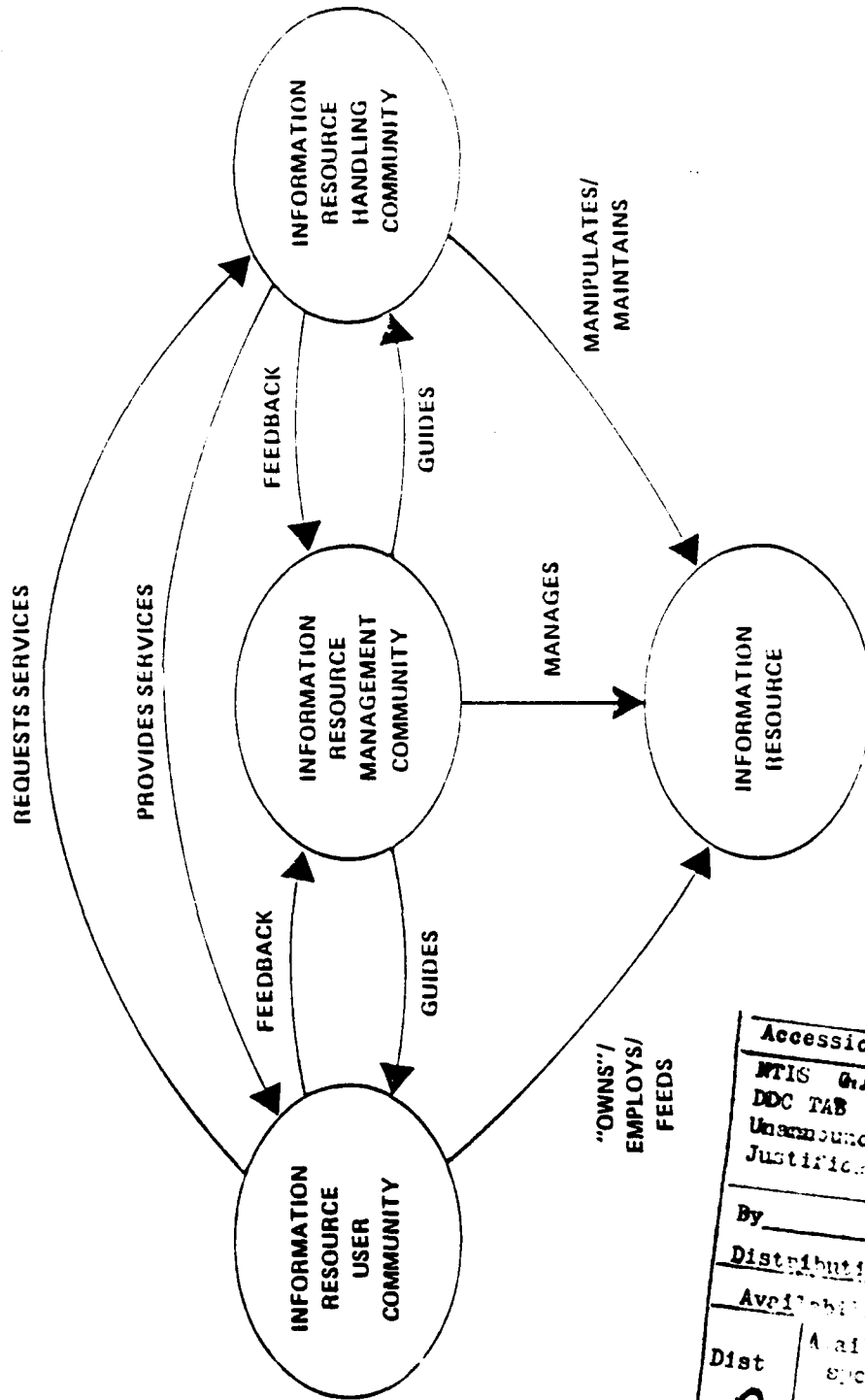
2. STUDY FINDINGS AND ISSUES

Our study analysis was based upon an extensive data collection methodology as illustrated in Exhibit 2. We have used this data to identify the need and to develop a conceptual program for managing automated information as a HQDA organizational resource. During our data gathering activities we identified several issues which are of major concern to HQDA with regard to information management. These issues are shown in Exhibit 3 and discussed briefly in the paragraphs which follow.

- (1) Limited sharing of information among Staff Agencies and DPIs results in redundant reporting requirements for the field and increased data processing costs.

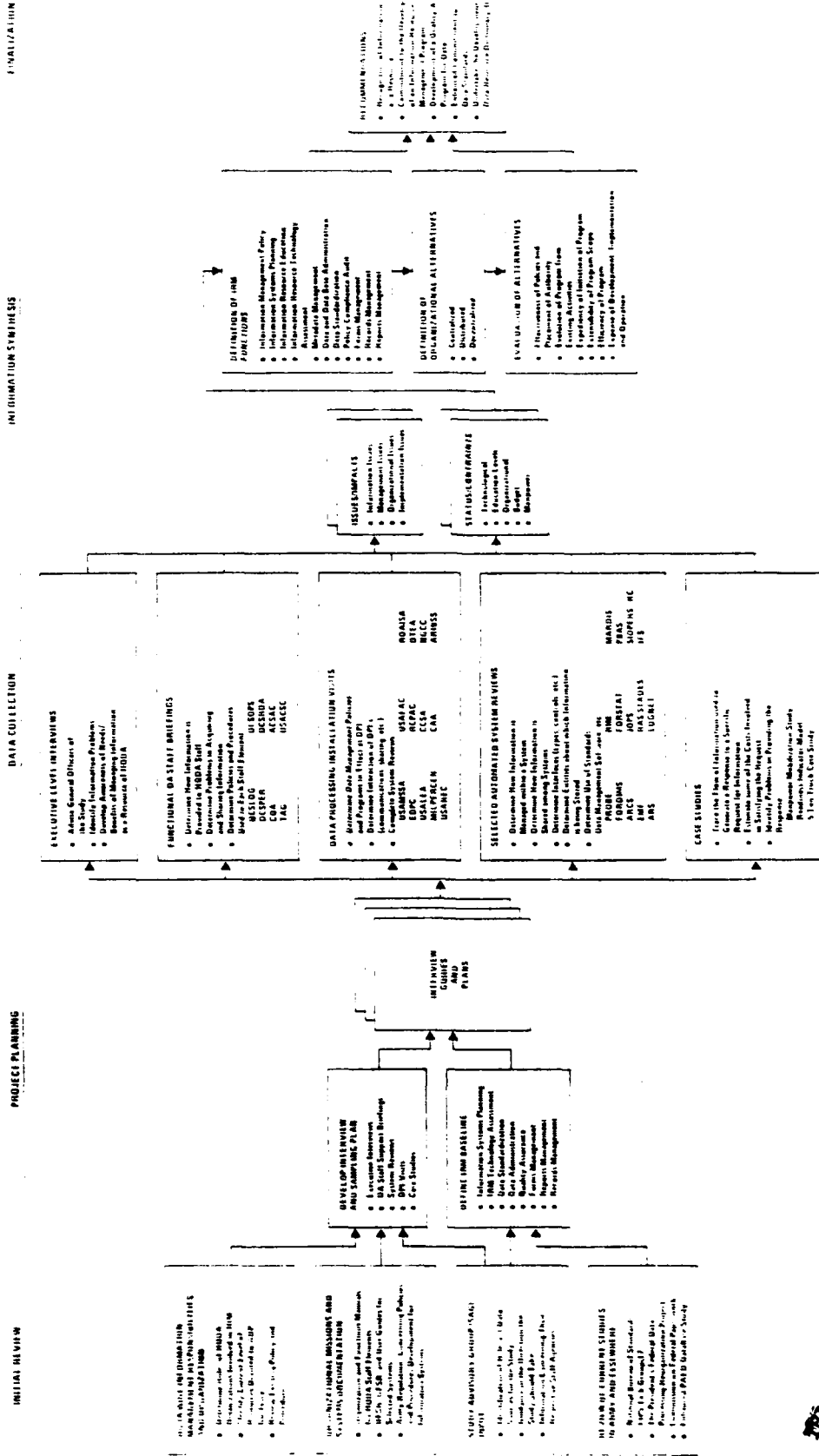
HQDA is concerned about the perceived excessive and redundant reporting requirements imposed on the field. There are numerous instances, such as with personnel and financial data, where essentially the same information is reported up through parallel, but distinct channels to HQDA. This information may then be used by the various Staff Agencies to manage their

The Information Resource Environment



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Headquarters, Department of the Army
Information Management Study Methodology



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HQDA Information Management

Major Issues

- LIMITED SHARING OF INFORMATION AMONG STAFF AGENCIES AND DPI'S RESULTS IN REDUNDANT REPORTING REQUIREMENTS FOR THE FIELD AND INCREASED DATA PROCESSING COSTS
- LACK OF A CENTRAL INFORMATION LOCATOR SERVICE FOR AUTOMATED INFORMATION INHIBITS TIMELY RESPONSE FOR ACTION ITEMS
- INSUFFICIENT FLEXIBILITY OF CURRENT HQDA INFORMATION SYSTEMS TO ACCOMMODATE CHANGE CAUSES A RAPID GROWTH AND PROLIFERATION OF DATA BASES AND REPORTING REQUIREMENTS
- INFORMATION INCONSISTENCIES, INACCURACIES, AND UNTIMELINESS HAVE AN ADVERSE IMPACT ON HQDA OPERATIONAL DECISION MAKING
- CURRENT HQDA AUTOMATED MANAGEMENT INFORMATION SYSTEMS DO NOT PROVIDE SUFFICIENT SUPPORT FOR ANALYSIS OF MANAGEMENT ALTERNATIVES
- BECAUSE NO SINGLE HQDA ORGANIZATION HAS BEEN ASSIGNED THE OVERALL COORDINATING RESPONSIBILITY FOR AUTOMATED INFORMATION MANAGEMENT THE STAFF AGENCIES AND DPI'S ARE ESTABLISHING THEIR OWN INFORMATION MANAGEMENT PROGRAMS
- ANTICIPATED INCREASES IN INTER-DPI DATA FLOWS CANNOT ADEQUATELY BE HANDLED BY THE CURRENT HQDA TELECOMMUNICATIONS CAPABILITY

individual programs but often is not shared across functional areas. HQDA lacks an effective mechanism for monitoring and controlling the costs associated with the reporting burden on the field as well as its own Staff Agencies and DTIs.

- (2) Lack of a central information locator service for automated information inhibits timely response for action items.

A large part of an Action Officer's time in working an action is spent in determining where relevant information might be found within HQDA. There is no central reference service in HQDA which can rapidly direct an Action Officer to possible sources of relevant automated information. The OPTIMIS system is one tool which has been developed to assist Action Officers in identifying previous action reports. However, OPTIMIS often does not contain sufficient information to permit a complete response to an action. Thus, an information network of Action Officers has evolved in which an experienced Action Officer attempts to locate the appropriate data via telephone calls to other staff members. Given the long learning curve associated with this information network and the limited tours of most Action Officers, this approach is often not efficient nor effective in providing timely, accurate, and consistent information for HQDA decisions.

- (3) Insufficient flexibility of current HQDA information systems to accommodate change causes a rapid growth and proliferation of data bases and reporting requirements.

Current HQDA information systems generally do not provide adequate flexibility to accommodate changes in requirements. Consequently, there is a tendency in HQDA to develop automated systems to support one-time critical studies or information analyses which may or may not be required again. HQDA may undergo considerable expense in developing a response to a request for information. In order to reduce the cost of answering that question again, should it be asked, an automated system may be developed or selected data elements may be added to an existing system. The result can be a growth and proliferation of data bases and reporting requirements which tend to remain long after the original need is satisfied.

- (4) Information inconsistencies, inaccuracies, and untimeliness have an adverse impact on HQDA operational decision making.

Inconsistencies and inaccuracies in information can have an adverse impact on HQDA operational decision making both in terms of the timeliness and quality of the decisions made. General Officers at HQDA are aware that, at times, decisions must be made based on information of questionable quality. However, at present there is typically no mechanism for quantifying the validity or reliability of information. In essence, they, or their staff, do not have available to them the relevant background data about

the information with which to assess its validity. Further, multiple copies of data bases exist in HQDA which are inconsistent or out of synch leading to confusion about which version is correct. The result can be a general mistrust and consequent avoidance of automated information systems as well as a potential for misguided decisions.

- (5) Current HQDA automated management information systems do not provide sufficient support for analysis of management alternatives.

A common exercise on the HQDA Staff concerns determining the impact of selected changes in the military environment, such as budget cuts or mobilization. These "what if" type questions are common on the Staff, but the current method of gathering required information is slow and frequently unresponsive. Information to support these analyses is now largely the result of manual processes or the subject of large studies supported by elaborate, specially built models. A substantial cost item in these exercises is the location of appropriate information and the interpretation of this data across systems and organizations.

- (6) Because no single HQDA organization has been assigned the overall coordinating responsibility for automated information management the Staff Agencies and DPIs are establishing their own information management programs.

The activities pertinent to the management of automated information as a resource are described in the next section of this summary. Some of these activities are currently being performed in several Staff Agencies and some are not being performed at all. The responsibility for establishing policy with regard to the management of automated information is distributed among ACSAC, TAG, COA, the Computer Systems Command, and the various Staff Agencies and DPIs. No one is currently in charge of information management, and the agencies, perceiving a lack of direction, are proceeding to develop localized, independent solutions to their information management problems. There is little consistency among these efforts, and what HQDA information policies do exist are not followed uniformly. These individual solutions, if left uncoordinated, will result in further information conflicts and inhibited information sharing.

- (7) Anticipated increases in inter-DPI data flows cannot adequately be handled by the current HQDA telecommunications capability.

The dynamic nature of the HQDA environment is causing increased demands for data by other agencies in addition to the DPI's functional proponent. DPI managers envision ever increasing requests for data, but the DPIs do not have sufficient automated telecommunication interfaces to support this increased demand.

Much of the inter-DPI communication of data is still in the form of magnetic tapes or hard copy reports. Information sharing is typically addressed on a case-by-case basis so that the overall problem of communicating large volumes of data among DPIs is obscured.

The common theme among these issues indicates a concern in HQDA over the effectiveness of the current approach to managing information and a widespread recognition that a new approach is required. Typically, HQDA management today focuses on the logistics of handling information and not on the management of the information itself. Hence, there are organizations responsible for data processing, communications, word processing, forms management, reports control, records retention, etc. But these activities, while necessary, tend to focus on the medium of the information and not on the information itself.

Information is one of four fundamental resources of Headquarters, Department of the Army: people, money, equipment, and information. HQDA is currently organized around the management of plans, systems life cycles, supporting services, and Army resources. In the area of resource management there are agencies responsible for managing personnel (ODCSPER), finances (OCOA), and equipment (ODCSLOG), but there is no single organization clearly responsible for managing information as a resource.

Information resource management is concerned with the knowledge and management of the composition, description, acquisition, dissemination, and flow of data or information where the information is held to be a resource of the entire organization. This does not imply that the management of these activities requires the execution of these functions by a single organization, nor that information resource management will control the collection, processing, or reporting of information to the exclusion of the individual Staff Agencies. These activities may be performed at many locations throughout HQDA, but there is the need for some consistent direction and guidance.

The full benefits of information resource management are long-range in perspective. The realization of some of these benefits may require several years to develop fully. However, immediate substantial benefits may be obtained earlier through implementation of IRM policies, procedures, and methodologies which will result in a reduction of redundant collection, processing, and storage of data. In addition, near-term improvements in the utility of existing data bases for multiple users can also be expected. The total impact of IRM will be seen as new information systems are developed and installed or as older systems are upgraded or replaced.

3. INFORMATION RESOURCE MANAGEMENT PROGRAM

The requirements for information management at HQDA indicate a need for an information resource management program (IRMP) to address these issues. Such a program will include:

- . An information management philosophy which must become an integral part of HQDA's management approach
- . A set of policies and procedures to impart the philosophy and to govern the program
- . An organizational structure to develop, implement, monitor, and execute the procedures and the program itself
- . A set of tools to assist the development, implementation, monitoring, and execution process.

We have identified 11 activities which are relevant to the management of information as a resource of HQDA. These activities are presented in Exhibit 4 and summarized in the following paragraphs.

(1) Information Policy Development and Promulgation

A key concept of information resource management is the development and promulgation of a consistent set of policies for HQDA with regard to information and information management. Basically, these policies relate to the remaining 10 activities of the information resource management program listed below. There is no single source of information policy in HQDA, today. Several agencies have a portion of this responsibility, including ACSAC, TAG, and the individual Staff Agencies themselves.

(2) Review and Coordination of Information Systems Planning

The vertical orientation of current HQDA information systems planning tends to focus on systems more than on the information they contain. There needs to be a horizontal view of information systems in HQDA which considers the potential use and availability of information among all of the agencies and organizations in HQDA. Such a horizontal view of information is rare in HQDA.

(3) Information Resource Education

One of the major benefits of the information resource management program is the ability to provide HQDA personnel with information on the location, description, use, and constraints of the data in the information resource. The development of such an information locator service and the education of HQDA personnel in the availability and use of the information resource is a significant activity of the program. Little effort is now devoted to the information resource education function.

Relevant Functions of Information Resource Management

- INFORMATION POLICY PROMULGATION
- INFORMATION SYSTEMS PLANNING REVIEW AND COORDINATION
- INFORMATION RESOURCE EDUCATION
- INFORMATION RESOURCE TECHNOLOGY ASSESSMENT
- METADATA MANAGEMENT
- DATA BASE ADMINISTRATION GUIDANCE
- DATA STANDARDIZATION
- POLICY COMPLIANCE AUDIT
- FORMS MANAGEMENT
- RECORDS MANAGEMENT
- REPORTS MANAGEMENT

(4) Information Resource Technology Assessment.

Information technology is a rapidly changing and growing field. An important function of an information resource management program is the tracking and assessment of current technological trends and developments in information management. While the assessment of equipment technologies may be better considered an ADP function, there will be sufficient technologies and methodologies relevant to information resource management to warrant a specific function in the program devoted to the assessment of information resource technology. Currently, this function is primarily addressed in the DPIs.

(5) Metadata Management

Metadata is data about data. Just as there is personnel data for the personnel resource or financial data for the financial resource, so too, is there metadata for the information resource. The management of metadata is basic to developing an understanding of the contents and characteristics of the information resource. A metadata management system designed to support IRM is critical to the effective and efficient execution of the program. Individual efforts at managing metadata are underway in several DPIs.

(6) Data Base Administration

Data Base Administration (DBA) is concerned with the technical design and maintenance of data bases used in information systems. Data Base Administration is a highly technical area which requires significant technical training. The DPIs are beginning to address the DBA function, but DBA skills are scarce within the Army today. Training, guidance, and assistance programs will need to be established as part of the information resource management program.

(7) Data Standardization

Data standardization is the development, maintenance, and enforcement of DA standard data element names, values, and coding schemes. The Army is currently pursuing a program in data standardization under ACSAC, CSC, and the DPIs. A data standards program is an integral and essential part of an information resource management program.

(8) IRM Policy Compliance Audit

An important aspect of a program involving policies and standards is the development of a process for auditing compliance with that program. The auditors (e.g., the Inspector General) will require sufficient technical training to determine policy compliance and sufficient authority and backing to insure cooperation in the audit process.

(9) Forms Management

Forms management concerns the design and control of the empty forms to be used as input media to automated information systems. The management of forms addresses the possible use of alternative forms, the consolidation of redundant forms, and the retention or purging of existing forms. Forms management provides a method for monitoring and controlling the information reporting requirements levied on the field. TAG is currently responsible for forms management, Army-wide.

(10) Records Management

Records management includes the management activities relating to the creation, maintenance, and use of official records. An information resource management program is concerned with monitoring and coordinating the information content of these records and managing the availability of official records for the benefit of the entire organization. TAG is the proponent for records management for the Army.

(11) Reports Management

Reports management involves the management of the reports produced by HQDA's information systems. This function includes tracking the need for continued production of (possibly outdated) reports and coordinating the development of new (possibly redundant) reports. TAG currently runs the reports management program for the Army.

We believe these 11 functions are basic to a program for managing the automated information resources of HQDA. Many of these functions are being performed in HQDA today, but they are lacking overall direction and a coordinated approach. We believe an information resource management program can provide that direction and coordination.

STUDY RECOMMENDATIONS

We have developed the following recommendations for HQDA in establishing an initial program for information resource management. These recommendations are summarized in Exhibit 5.

RECOMMENDATION 1: The concept of information as an organizational resource should be recognized by HQDA management and promulgated as Army policy.

Information is critical to the performance of HQDA managerial functions. To provide proper focus and direction for information management at HQDA, we recommend that the concept of information as a valuable and expensive organizational resource be recognized by HQDA management and promulgated as Army policy. The promotion of this organizational philosophy is needed so that managers throughout HQDA

Study Recommendations

- THE CONCEPT OF INFORMATION AS AN ORGANIZATIONAL RESOURCE SHOULD BE RECOGNIZED BY HODA MANAGEMENT AND PROMULGATED AS ARMY POLICY
- TOP MANAGEMENT COMMITMENT AND SUPPORT SHOULD BE GIVEN TO THE DEVELOPMENT OF AN IRM PROGRAM
- AN EVOLUTIONARY APPROACH SHOULD BE FOLLOWED IN THE DEVELOPMENT OF THE IRM PROGRAM
- AUTOMATED INFORMATION SYSTEMS AT HODA SHOULD BE USED AS THE STARTING POINT FOR THE IMPLEMENTATION OF THE IRM PROGRAM

Study Recommendations

- THE DEVELOPMENT OF THE HQDA AUTOMATED IRM PROGRAM SHOULD PROCEED IN PHASE II FOLLOWING THE DISTRIBUTED ORGANIZATIONAL APPROACH
- CONSIDERATION SHOULD BE GIVEN TO THE EXTENSION OF THE IRM PROGRAM TO INCLUDE NON-AUTOMATED INFORMATION AFTER THE BASIC PROGRAM IS ESTABLISHED
- CONSIDERATION SHOULD BE GIVEN BY HQDA TOP MANAGEMENT TO THE PLACEMENT OF AUTHORITY AND ASSIGNMENT OF RESPONSIBILITIES IN ESTABLISHING THE IRM PROGRAM
- PARTICULAR EMPHASIS SHOULD BE PLACED ON MAKING IMPROVEMENTS IN THE DATA ELEMENT STANDARDS, DATA RESOURCE DIRECTORY, QUALITY ASSURANCE, AND INFORMATION COST ACCOUNTING AREAS

can develop the perspective necessary for the design and implementation of information resource management.

RECOMMENDATION 2: Top management commitment and support should be given to the development of an information resource management program.

The implementation of any new program cutting across organizational lines will fail without positive and continuing management backing. Recent initiatives in the ADP and information management areas at HQDA, although offering the potential for improving management and organization effectiveness and efficiency, have not been fully implemented. To realize the full benefits of IRM and to establish and maintain proper program direction, we recommend that the commitment and support of the Army Staff be given to the development of an information resource management program.

RECOMMENDATION 3: An evolutionary approach should be followed in the development of the IRM program.

The implementation of the IRM program at HQDA should not be revolutionary, but rather must be built on existing information management activities. Many of the functions relevant to IRM are currently being performed in a number of locations throughout HQDA, but there is a lack of coordination among the activities, especially across Staff Agencies. There is also a lack of focus on managing information as a resource, i.e., from a horizontal view. Instead, a concentration exists on managing systems in a vertical fashion with a view of information as an integral part of each system. The result is the local optimization of information definition and representation to achieve Staff Agency missions.

We recommend that the IRM program at HQDA be evolutionary in nature. Initially, the concept must be established with sufficient resources to assure its growth. Too broad an objective at the outset, however, could prove fatal to the program by forcing change too rapidly. A gradual controlled transition will be necessary over a period of, perhaps, 5-10 years. The transition must be directed or focused by an organization or group of leaders with a long-term perspective: people who can coordinate the ongoing and future development of information systems, but who can also achieve the shorter term benefits to ensure success.

RECOMMENDATION 4: Automated information systems at HQDA should be used as the starting point for the implementation of the IRM program.

The overall success of the IRM program will be directly dependent on its ability to demonstrate improvements in the early stages of program development. A comprehensive program addressing all aspects of information management would require major organizational and technological changes, and may encounter much resistance by HQDA Staff

Agencies. Many management programs have failed in the past because of the setting of over ambitious and unachievable program goals and objectives in their initial years of development.

We recommend that automated information systems at HQDA be used as the starting point for the implementation of an IRM program. With this more narrow focus, the information management staff can concentrate on specific areas which will bring about the greatest return in terms of information improvement during the first several years of operation. There are already well-defined tools to assist in the management of automated information, and certain doctrines and concepts relating to automated data bases and data administration are already established. Further, metadata about automated information is more readily available. This gradual implementation approach beginning with automated information is also compatible with the development of alternatives for addressing the full spectrum of information, both automated and manual. The IRM program for automated information could be used as a baseline for the development of a HQDA or Army-wide long range plan for information resource management.

RECOMMENDATION 5: The development of the HQDA automated IRM program should proceed in Phase II following the distributed organizational approach.

We have defined the HQDA requirements for an IRM program for automated information. Three organizational alternatives were identified and evaluated. These alternatives were:

- . Centralization of authority and responsibility at the highest common point in HQDA to insure an efficient and effective program
- . Distribution of operational aspects of IRM authority and responsibility with centralization of information policy and some HQDA-wide information management activities.
- . Decentralization of authority and responsibility as close as possible to the level of HQDA where the information is used; coordination of inter-functional area concerns would be accomplished through an Oversight Committee.

Our assessment of the advantages and disadvantages of each alternative, the demonstrated needs of HQDA, and the current organizational environment have led to our recommendation of a distributed approach which is a hybrid of the classical centralized and decentralized approaches. The basic philosophy of this approach is analogous to that of distributed processing: Locate the work at the level in the organization which is best suited to perform the task. We have developed the essential philosophy and concepts of the distributed approach in Phase I of our study. In Phase II we shall proceed with the detailed definition of the selected approach and the specification of an implementation plan for installing information resource management at HQDA.

RECOMMENDATION 6: Consideration should be given to the extension of the IRM program to include non-automated information after the basic program is established.

Our study has focused on developing a program for managing the automated information resource of HQDA. Automated information is only one subset of the overall information resources of HQDA. The concepts of information management are equally applicable to non-automated information and should be considered irrespective of the medium on which the information is collected, stored, transmitted, or reported. Any future program development should consider the limited organizational scope of the present study. Much of the data received by HQDA is submitted by field commands and operating agencies. Extension of the scope of the program beyond HQDA can facilitate the submission of this data.

We recommend that full consideration be given to the extension of the IRM program to include non-automated information as well as information management policies which are applicable to all Army activities. The early focusing of scope is commensurate with the long-term evolutionary approach to IRM by defining an achievable but important first step to serve as a prototype. The IRM program for HQDA has been carefully designed so that future extensions of scope are possible. It should also be pointed out that the growing trend towards more and more automation in the Army implies that information considered beyond the scope of this effort today may well be automated and, hence, within the program scope in the near future. There is also the likelihood that an effective information resource management program at HQDA will foster similar, related programs throughout DA as well.

RECOMMENDATION 7: Consideration should be given by HQDA top management to the placement of authority and assignment of responsibilities in establishing the IRM program.

The management of the information resource must be accomplished in a way that assists the various Staff Agencies (and, thus, the field and installation commands) in meeting their missions and not as a program which merely regulates their actions. To achieve this goal will require extensive user involvement in the process of managing the information resource. User responsibilities will need to be clearly defined and accepted. Proponents, consumers, and sources of information will need to be integrated into the information resource management process and not relegated to merely a passive, compliance or recipient role.

Given the present organizational structure of HQDA and its associated information management functions, one of the most critical decisions to be addressed by the Army Staff in this area is the placement of authority and assignment of responsibilities for

information resource management. We recommend that careful consideration be given by HQDA top management during Phase II to the placement of authority and assignment of responsibilities in the establishment of an IRM program for HQDA. Organizational assignments must include the blending of the right participants together with the right degree of authority and control. The successful implementation of the program will depend upon the proper perception and support of the program by the Staff.

RECOMMENDATION 8: Particular emphasis should be placed on making improvements in the data element standards, data resource directory, quality assurance, and information cost accounting areas.

There are a number of improvements which can be made at HQDA that are a part of the overall IRM program but which could be implemented independent of a decision to proceed with the development of an IRM program. These improvements are directed at specific problems that were identified during the conduct of the study. These specific areas include data element standards, data dictionaries and directories, quality assurance, and cost accounting for data. These areas, although somewhat independent of a full information resource management program, are essential to the success of IRM. In particular, the implementation of a distributed metadata management system is essential to HQDA's management of its complex information environment.

5. CONCLUSION

As a result of implementing these recommendations, we anticipate the Army will gain substantial near-term and longer range benefits. However, it should be recognized that IRM is necessary, but not alone sufficient to achieve these benefits. To achieve these benefits IRM must be integrated into the Army's existing management process. The definition of this integration is the subject of Phase II of this study. The benefits the Army should expect to obtain are:

(1) More Effective Operational Decision Making

HQDA can facilitate effective decision making by enhancing the sharing of information across functional organizations. Critical HQDA decisions typically require the integration of information, thus implying the need to know where relevant information can be found and the context under which it should be interpreted. The management of information as a resource can lead to reduced data inconsistencies and the identification of conditions relating to the currency and accuracy of the information.

(2) Improved Planning and Resource Management

Managing information as a resource of HQDA can improve the planning and resource management process by providing more

relevant information focused on the needs of the Army through the coordination of reporting requirements. The result can be reduced waste, cost savings, and more effective execution of plans. The flexibility provided by managing information, as opposed to managing systems, can contribute to improved planning through the support of "what if" drills and analytical models.

(3) More Cost-Effective Information System Development

An information resource management program can assist the planning process for information system development by establishing stable definitions for information, identifying alternative sources of information which may already exist, and providing a framework for the identification and verification of information system requirements. The result can be reduced duplication of information and development effort, reduced demand for computer resources to process essentially the same data, and a reduction in system redesign costs as changes occur in the system environment.

(4) Reduced Reporting Burden on the Field

The identification and coordination of the information requirements of the HQDA Staff Agencies can effectively reduce the reporting burden on the field by consolidating information reporting channels. Properly planned, the field commanders can report specific information to a particular designated agency, and the other agencies can obtain the information they need from that proponent. Staff Agencies would be more aware of the reporting burden which their requests for information impose on the field.

(5) Increased Responsiveness to Requests for Information

An information resource management program can increase the responsiveness of the Staff Agencies to satisfy external information requests by providing information locator services to assist the Action Officers, by establishing the framework for sharing information among the various data processing installations and Staff Agencies, and by coordinating the reporting of information to control inconsistencies.

(6) Improved Posture for Transition to Future Environments

The IRM program can place the Army in a better position for evolving to the automation environment of the future. The development of future decision support systems is predicated on the availability and accessibility of information from a variety of sources. This information, to be useful, must be coordinated in a fashion which permits the application of automated technology which in turn will require a heavy emphasis on standardization and common data representations.

Of course, the implementation of an information resource management program will not be without cost. The primary cost will be that associated with personnel to establish and maintain an IRM program. However, many of the activities of information resource management can be staffed from existing spaces. What is currently lacking is coordinated direction of information management efforts across the Staff Agencies.

A significant cost item for the Army will be the development of an information system to manage metadata throughout HQDA. The development of a Data Resource Directory will require a substantial effort (perhaps phased over several years), but such a system can be expected to provide considerable savings in the form of reduced staff time to locate relevant information, identification of potentially costly information redundancies, and improved effectiveness of selecting relevant and timely information in conducting studies and actions.

More and more information can be expected to be automated in the years ahead. Continuation of the Army's current approach to information management can be expected to lead to still further problems in awareness, responsiveness, and reutilization of information. Implementation of an information resource management program now can establish the process of organizing and inventorying the Army's information to facilitate the transition to this environment of automated support for the decision making process and to provide a mechanism for controlling the costs of automated systems.

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