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A strategic plan for MIS at James River Corporation of Virginia

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**A STRATEGIC PLAN FOR MIS
AT JAMES RIVER CORPORATION OF VIRGINIA**

An Independent Research Project
Submitted In Partial Fulfillment
Of The Requirements For The MBA Degree

by

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ABSTRACT

The objectives of this paper are (1) to present a methodology for developing an M.I.S. strategic plan, and (2) to recommend a M.I.S. organizational structure for James River Corporation of Virginia.

The paper begins by describing the five businesses of James River and then describes a process for developing a strategic plan for a M.I.S. function. The next two sections define a desired future state for M.I.S. in James River and present guidelines for implementing this future state. The fifth section defines a method of implementing the strategy across the five diverse businesses of the corporation.

I. INTRODUCTION

James River Corporation of Virginia came into existence on April 25, 1969, with the purchase of a paper mill and converting plant- both in Richmond, Virginia. Net sales for that first year were \$5,474,000. Employees numbered 110. As of April 28, 1985, seventeen acquisitions later, net sales were \$2.5 billion and employees numbered approximately 21,000.

Today, James River has 70 locations (excluding sales offices) located across the United States, in Canada and in Scotland. These locations range in size from large, integrated pulp and paper mills with 1400 employees to a small, single paper machine mill with 50 employees.

James River's primary competitive edge has been determined to be PERFORMANCE; i.e., the development and delivery of better performing products and service programs that allow both the Company and its customers to enjoy higher profitability. A customer sensitized organization, a participative management style, and the application of the unique skills of James River people, combined with capital and cost effective product, process and systems technology, are the primary tools that will be emphasized to create Performance (Strategy Statement), (See Appendix 1).

James River today is composed of five "businesses": Specialty Papers Business, Communication Papers Business, Towel & Tissue Business, Dixie Products Business, and Paperboard Packaging Business. General characteristics of these businesses are as follows:

Specialty Papers

- high product diversity within the business
- relatively complex information needs
- strategic information needs are focused at the group or division level

Communication Papers

- high product diversity within the business
- developing an integrated marketing approach in Specialty Printing Papers Group
- Strategic information needs are focused at the group or division level

Towel & Tissue

- consumer products; sales and marketing oriented
- strategic information needs focused at business level; information intensive (marketing and manufacturing)
- information support for customer service is key MIS role

Dixie Products

- multiple ways of going to market; complex information needs

- competitive need to lower costs
- strategic information needs focused at business level; information intensive (marketing, logistics, manufacturing)
- information support for customer service and logistics are key MIS roles

Paperboard Packaging

- job shop environment
- two key competitive markets:
 - o large customers with large, long term orders; extensive cost information requirements
 - o small one-time orders; require timely production planning and cost information
- strategic information needs focused at business level; information intensive (manufacturing)

Each of these businesses is treated as a profit center, and overall, the Corporation is not a holding company but a complex enterprise with similar and overlapping activities running across the Corporation (Strategy Statement).

These businesses all incorporate data processing into their daily operations to different extents - some to a very large degree and some to a very small degree. To more accurately determine the extent to which each business incorporates data processing into its present operations as well as what its plan

for the future use of data processing is, an interview was conducted with the Vice-President, Group Executive of each of the businesses (See Appendix 2). The following is a summary of how each business incorporates data processing today (Group Executive Interviews):

Specialty Papers

- no common, business-wide MIS support
- subsistence level spending on MIS
- local processing at two divisions
- some distributed processing (accounts receivable)
- some centralized processing of mill systems (inventories and invoicing)

Communication Papers

- no common business-wide MIS support
- local processing at four divisions
- some centralized processing of mill systems (inventories and invoicing)

Towel & Tissue

- business systems are critical to operations
- trends toward placing strategic emphasis on MIS
- local processing of mill systems
- centralized processing of business systems

- minimal dependence between local and central processing

Dixie Products

- business systems are critical to daily operations
- because of cost, current use of MIS is not a competitive advantage
- centralized processing of business systems
- local processing of mill systems
- minimal dependence between central and local processing

Paperboard Packaging

- business systems are important to management decision making
- centralized processing of business systems
- local processing of mill systems
- distributed processing for all accounts receivable in business

The MIS organization within the Corporation today is comprised of two corporate data centers (Richmond, Virginia and Kalamazoo, Michigan), one corporate I/O Center (Norwalk, Connecticut) and 28 mill/plant locations (which report to the businesses) with computer hardware installed (See Appendix 3). Until now there has been no effort to define a structure for the Management Information Systems activities within the corporation.

Given the background on the businesses and the relatively unstructured MIS organizations within the corporation, the objective of this paper is to define a MIS strategy that will satisfy both business and MIS issues. These issues are as follows:

Business Issues

- Timeliness of information
- Usefulness of information
- Accessibility to data
- Availability of user-oriented analytical tools
- Decentralized decision making
- Proactive vs. reactive management
- Recognition of differences among businesses
- MIS response to business changes
- Improved customer information
- Improved product information
- Recognition that critical success factors are different for each business
- Cost

MIS Issues

- Improved people productivity
- Increasing information needs of businesses
- Increasing analytical needs of decision makers

- Increasing need for graphics capabilities
- Inadequate project management
- Better management of technological innovation
- Improve MIS planning

The scope of this paper is limited to James River Corporation of Virginia.

II. THE STRATEGIC PLANNING PROCESS

A comprehensive strategic plan is usually the product of well thought out planning procedures which specify the format of the plan, the schedule for its preparation, and the review and approval steps required for its issuance. These procedures may be extensions or adaptations of procedures that guide all elements of the organization in preparing inputs to corporate plans (Head 1982).

Strategic planning, then, is "the process of deciding on objectives of the organization, on changes in these objectives, on the resources used to attain these objectives, and on the policies that are to govern the acquisition, use, and disposition of these resources. Strategic planning is a process having to do with the formulation of long-range plans and policies that determine or change the character or direction of the organization (Anthony 1965, p. 24.)

The MIS strategic planner should take into account three basic questions in formulating strategic plans:

1. What is the technology going to be like over the planning period?
2. What changes will take place in the environment in which the organization must operate?

3. What are the organization's long-range goals and policies?

These are essentially the same questions that confront top management seeking to formulate overall corporate strategy. In the context of MIS planning, however, they must be particularized to apply to that area of activity (Head 1982).

1. Technology

Information systems technology is advancing rapidly, and this pace of change is one of the contributing factors to an increased emphasis on planning. Within a period of five years, major technological developments in the form of new equipment and software product introductions can be quickly identified and anticipated. Assuming a five-year planning period, virtually all new products that will come on the market are already in the product planning or engineering stage. Very reliable forecasts of future products and prices are available from manufacturers, independent research firms, or consultants. Despite this rapidity of change, the knowledgeable strategic planner can take a fairly accurate fix on what the technology is going to be like. This does not mean, of course, that there are no uncertainties in gauging the future impact of technology - including software and hardware developments. There remains uncertainty about which potential new products will gain acceptance and prove cost effective and which will not. One of the values of formalized strategic planning is that it forces the planner to become con-

versant with new technology and to focus thinking about how such technology should be utilized.

2. Environment

The environment in which future systems activities are to be conducted has two distinct but related aspects. One has to do with the workings of the organization (internal) as they affect information systems needs, and the other broader situation within which the organization itself must operate (external).

There are numerous phenomena within the organization that impact systems planning: a change in the organizational location of a function (e.g., a shift in reporting relationship from the controller to the chief executive officer); a series of recurring losses (an adverse affect on budgets); relocation of company operations; and changes in accounting methods.

Changes in the external environment could include changes in the strategies of competitors, rate of new product introduction, purchasing and consuming habits of the firm's customers.

Many of these environmental factors can be identified, and perhaps to some degree controlled by the strategic planning staff; others are difficult to anticipate let alone control.

3. Goals and Policies

Certain policies can have direct and immediate impact

on systems planning. A policy of expansion through mergers and acquisitions will have the consequence of requiring systems managers to integrate disparate systems and equipment, often with horrendous problems in hardware and software compatibility.

Difficulties can also arise if policy mandates that growth be achieved through diversification rather than expansion of existing product lines. The new products may require totally different kinds of support from that which the systems staff has been accustomed to providing.

Even if policy merely demands that the company remain competitive within its existing product and service areas, there are strategic planning implications. Should the company endeavor to be innovative in the systems realm in order to improve its products and services and thus enhance its share of the market? Conversely, to lag too far behind the competition, especially in industries in which the computer is being integrated into mainstream activities, is to run the risk of falling dangerously behind.

Given these three basic questions, what kind of a process can be used to formulate a strategic plan? An invitational conference was held at U.C.L.A. that included two days of discussion on strategic planning objectives, the development process, and end products of this long-range planning effort. More than 90 percent of the participants adopted a combination "bottom-up, top-down" approach in carrying out their planning efforts (McLean, Soden 1977). This approach contained five steps:

1. Development of a statement of overall MIS objectives before undertaking the strategic planning effort.

2. Business performance analysis to identify key company profit leverage areas in which to focus efforts to generate new application ideas.

3. Interviewing of top management early in the planning process to develop an understanding of the overall company and its strategic direction.

4. Direct linking of the MIS plan to support the formal business plan of the overall enterprise.

5. Support of, and pressure from, top management to expedite user involvement in the MIS planning effort.

A major objective of any strategic plan for information systems must be the improvement of organizational productivity. Developing and implementing an information systems strategic plan should enable the various departments in the organization to achieve their goals more quickly. This should result in reduced operational cost, improved control, increased revenue or some other measure used to determine project priority (Hannan, 1985).

III. DESIRED FUTURE STATE

This section provides a definition of the state which James River plans to ultimately attain to effectively utilize MIS in supporting implementation of the Performance Strategy and successfully sustain James River's system of values within MIS (See Appendix 4). This section, Desired Future State, section IV, Guidelines for Implementing Future State, and section V, were written with the cooperation of the Strategy and Planning Department, a function within James River Corporate MIS.

A. BUSINESS INFORMATION REQUIREMENTS

Each of James River's businesses is to be accountable for the identification and generation of the information required to support the cost-effective operation of its ongoing activities and to support the business in achieving superior product performance and competitive advantage in the market place.

The business is to be accountable for: determining the type, content, and form of information it requires; insuring information quality in terms of accuracy, relevance, and integrity; and providing timely delivery of the required quantity of information or accessibility to it.

In addition to being accountable for its own information requirements, each business is also to be accountable for compliance with corporate information requirements and conformance with corporate information standards.

B. INFORMATION RESOURCES

Information, like capital and people, is a critical resource to the corporation. New investments and ongoing expenditures for information resources (i.e., information and the technology required to collect, process, deliver, and access the information) require management control and coordination comparable to those measures governing capital investments. As in the area of capital investments, control over the authority levels for investments in information resources is to be centralized. In addition, corporate management is to be accountable for establishing a corporate information resources investment strategy which provides overall direction for investment decisions in this area.

James River's strategy states that the Company "will place extraordinary emphasis on product information and sales support systems technology and communications." The investment strategy for information resources will provide the basis for allocating limited investment resources among businesses and enable focused investment decision making in those businesses and programs determined to be strategic.

C. PLANNING FOR INFORMATION RESOURCES

In order to effectively plan for investments in information resources, each business is to be accountable for developing a process for defining and prioritizing requirements for information resources, coordinating ongoing implementation and changes, integrating these requirements and priorities in support of the business plan, and insuring conformity with the corporate information resources investment strategy.

Centralized accountability in planning for information resources involves maintaining an understanding of trends in information technology, determining potential benefits and risks of new information technology, assessing the use of new information technologies by James River's competitors, and communicating this information to the businesses through the planning process.

D. DEVELOPMENT OF INFORMATION RESOURCES

Each business is to be accountable for development activities necessary to support its information requirements. These development resources will generally reside in the businesses in accordance with the corporate centralization/decentralization policy (Decentralized Interpretive Paper).

Centralized accountability for development will focus on providing support to the businesses in the areas of core information technologies, i.e., hardware, operating systems, programming languages, and communications protocol.

Development activity will be performed in accordance with corporate standards to provide for compatibility of resources (enabling integration and efficiencies), responsiveness to corporate information requirements, and consistently acceptable levels of quality.

Authority levels over investments in developing information resources are to be determined centrally (comparable to the capital approval process).

E. COMMUNICATIONS

Given the pervasive nature of both data and voice communications in generating, processing, delivering, and accessing information, the accountability for fulfilling the business requirement for cost-effective, reliable data and voice communications is to be centralized.

Each business is to be accountable for identifying and satisfying business-unique and intra-site communications requirements. The central staff is to be accountable for providing the businesses with required support in the areas of "core communications technologies", i.e., the communications access method (software) and network protocols.

Communications services will be performed in accordance with corporate standards to provide for compatibility of resources (enabling integration and efficiencies), consistently acceptable levels of quality, and corporate-wide optimization of communications resources.

F. PROCESSING

The accountability for effective processing of information is to be decentralized. Each business is to be accountable for the delivery of information to the line organizations and the resources required to accomplish this delivery. The organization responsible for accomplishing these tasks and managing the required resources may be either centralized or decentralized depending on the characteristics of the information to be processed.

Decentralized processing at the business sites will take advantage of the cost-effective nature, low technical overhead, and minimal complexity of minicomputers for processing in the low volume environment and the flexibility and responsiveness of local processing for addressing site unique systems.

Centralized processing will take advantage of the cost-effective nature, low overhead per unit processed, and performance of mainframe computers for processing in a high volume environment; accessibility of large, shared data bases; hubbing of all network-based systems from one location; single processing of cross-business systems; and the reliability and security inherent in processing large systems centrally.

Processing activity will be performed in accordance with corporate standards to provide for compatibility of resources (enabling integration and efficiencies) and consistently acceptable levels of quality.

G. STANDARDS

The central staff is to be accountable for the establishment of standards by which information and the technology required to collect, process, deliver, and access it will be managed. Common standards applicable to corporate-wide information resource management provide the basis for effective planning development, communications, and processing.

The pervasiveness of standards requires the involvement of appropriate line and staff representation in the process of developing specific standards. Once standards are implemented, the businesses are accountable for compliance with the standards.

Some of the areas of information resource management covered by standards include:

- * hardware characteristics
- * technical software
- * application programming language (mainframe and mini)
- * interactive online programming language
- * data base management language
- * telecommunications access method and protocols
- * micro-mainframe interface software
- * site security, data security
- * data accessibility
- * information center software
- * operating methodologies
- * application programming methodologies
- * voice communications hardware

IV. GUIDELINES FOR IMPLEMENTING FUTURE STATE

A. PLANNING

1. Management information systems, like any asset, require funds for development and maintenance so that the necessary funds are available. A planning process must be implemented to insure the necessary funds are budgeted and the necessary human and hardware resources are available.

"Planning practices influence the performance of the resulting information systems. At the heart of this planning process is the issue of making a commitment of a large amount of organizational resources for development of computer systems" (Shrivastava 1983).

To be consistent with the capital investment program, corporate management will develop the investment strategy for information resources and the authority levels for investing in information resources. The investment strategy and authority levels will be implemented at the business level in the form of a service request process and will be coordinated by corporate MIS.

2. Each business will develop a focal point with the formal charter and responsibility for defining and prioritizing requirements for information resources, coordinating ongoing implementation of these resources, integrating these requirements and priorities in support of the business plan, and insuring conformity with the corporate information resources investment strategy and standards.

3. The businesses and Corporate MIS staff will develop a forum for coordinating the planning efforts of the various MIS groups to insure appropriate consideration of mutual or pervasive impacts and provide for optimal use of information resources.

4. The central MIS function will develop a process for maintaining an understanding of trends in, and competitive uses of information technologies; establish an ongoing process to evaluate new technologies, assess potential benefits/risk, and determine applicability to and impact on businesses; and establish an ongoing process to assess the use of new technologies by competitors to determine impact on James River's competitive position. Corporate MIS will serve as a collection agency for information gathered by the businesses as they interface with markets and competitors.

5. Each business and staff group will include as a component of its annual budget and strategic plan an assessment of its needs for information resources: people, hardware, software, communications, and data.

B. DEVELOPMENT

"For the MIS department, an effective systems development plan will help insure that projects will be taken on that are consistent with organizational goals and priorities" (Hannan 1985).

1. Corporate and business unit MIS will develop solutions tailored to business problems based on an overall assessment of business requirements, business profitability, and business investment priorities.

a. Develop simple, low-cost responses to business requirements where the profitability, investment priorities, or other business conditions dictate a "coping approach" to using information resources. Coping involves applying patches to facets of a problem or its symptoms, not actually solving the whole problem.

b. Develop function-focused responses to business requirements where the problems are relatively isolated to a specific business function and the profitability, investment priorities, or other business conditions dictate a "selective approach" to using information resources. Selecting involves solving the whole problem associated with one specific function, such as order entry, without addressing related systems (invoicing, sales analysis, cost, freight, etc.)

c. For those businesses where profitability, investment priorities, or other business conditions dictate a "comprehensive approach" to using information resources, the response to business requirements is to be planned on a "comprehensive" basis but implemented in a modular style that breaks down the overall effort into manageable, function-focused responses. The comprehensive approach involves solving the whole problem associated with a complex of business functions, such as order entry and related systems including invoicing, sales analysis, freight payment, inventory management, etc.

C. COMMUNICATIONS

"Changes in technologies for data, text, graphics, and voice communication are as explosive as computer hardware changes. Satellites, fiber optic systems, microwave communication, and local area networks are now so interlocked with computers that the computer function has been transformed to the computer - communication function. Computer systems today are used increasingly to communicate data throughout the corporation" (Rockart, Morton 1984).

1. Corporate MIS will implement business-driven, cost-effective, reliable data communications capabilities that enable: effective networking for online processing; efficient transfer of data among James River locations; and data communications with external locations.

a. Maintain a network of leased lines hubbed at the Richmond Data Center to effectively process high volume online transactions, data transmissions, and VM timesharing work.

b. Maintain a dial-up capability into the central processing environment where business conditions do not warrant leased line connections.

c. Implement software capability to transfer data files among computing locations.

d. Implement software capability to transfer text among computing locations and non-network locations.

e. Enable direct data communications with customers, brokers, vendors, etc.

f. Develop a methodology, within the overall telecommunications and data access strategies, to access and exchange data between personal computers and other computing devices.

2. Corporate MIS will implement business driven, cost-effective and reliable voice communication capabilities that enable: effective networking among locations; interchangeability that accommodates moving equipment between locations to maximize returns on investment in equipment; corporate-wide planning for expansion and change to take advantage of installed base of

equipment and lines; and, minimizing the overall cost of effective voice communications to the Corporation.

a. Standardize the selection of telephone equipment with two national vendors to optimize the mix of cost/benefit and quality of service to businesses. ROLM Corporation PBX systems will be used to build the corporate voice network to take advantage of high traffic routes between major locations and to maintain the functional continuity of the network. A standard family of cost-effective telephone systems from AT&T Information Systems will be used at all non-network hub locations.

D. PROCESSING

"The rapidly decreasing cost of computer hardware has led many to predict that, within this decade, almost all people handling information in corporations will have terminals at their desks. The terminals will allow both remote access to major data bases and the ability to perform local computation with local storage of data" (Rockart, Morton 1984).

1. Each business site will implement effective and autonomous local processing and local control of decentralized computing within the overall guidelines defined by corporate

strategy and standards.

a. Within those locations where the business case justifies local processing, the business will provide effective computing for site-unique or business-unique applications.

(1) automate labor - intensive applications where improved timeliness and/or cost reduction provide rationale for automation (cost accounting, inventory control, work order control, production reporting, hourly payroll, etc.);

(2) automate analytical applications where improved job content and a shift in time use from number crunching to analysis provide rationale for automation (variance analysis; sensitivity analysis for bill-of-materials, production planning material requirements, pricing, manning, etc.);

(3) automate manufacturing support applications where improved information quality, comprehensiveness, timeliness, content, etc. provide rationale for automation (mill-wide waste management; energy management; exception reporting vs. statistical dumps on manufacturing efficiencies, downtime reporting, etc.).

b. Within those locations where the businesses implement local processing, the location will develop effective communications with process control environments to enable uploading of data and computing capability to process this data.

2. Each business will implement cost-effective, efficient, flexible centralized computing capability for mainframe-based systems within the overall guidelines defined by corporate

strategy and standards. Such a centralized implementation will:

a. Enable accessibility to and processing of shared data bases.

b. Take advantage of economies of scale relating to centralized processing of mainframe-based systems.

c. Take advantage of having one data communications network by centralizing processing of network-dependent systems.

d. Centralize cross-business systems to take advantage of economies of scale relating to processing, maintenance and data communications.

E. STANDARDS

"A comprehensive standards program should cover all aspects of systems development, operations, hardware and software acquisition and utilization, data communications, data base administration, and application design and development" (Head 1982).

1. Corporate and business MIS groups will standardize application development methodologies to provide for compatibility of resources (enabling integration and efficiencies), responsiveness to corporate information requirements, and consistently acceptable levels of quality.

a. Standard programming languages will be utilized to provide for commonality, transferability, and compatability of applications programs and staff skills. COBOL will be utilized for batch application programming in the mainframe environment (MVS). Standard programming languages supplied and supported by the minicomputer vendor will be utilized in the local processing environment.

b. IMS will be utilized as the data base management system for high-volume, transaction-type application programming in the mainframe environment (MVS). Data base management systems supplied and supported by the minicomputer vendor will be utilized in the local processing environment.

c. CICS will be utilized as the standard programming language for developing centralized business applications with interactive online communications. Interactive programming languages supplied and supported by the minicomputer vendor will be utilized in the local processing environment.

d. The VM environment will be utilized as the prime Information Center operating system for all users. Standard, user-oriented programming languages will be utilized to enable user access to and reporting against business data. FOCUS will be the primary report writing language within the information center environment (VM, Timesharing).

e. Develop common key data to facilitate effective application development, reporting, analysis, integration, and transferability on a corporate-wide basis. Key data includes

customer number, vendor number, commodity code, chart of accounts, location/site identification, etc.

2. Standardize communications methodologies to provide for compatibility of resources (enabling integration and efficiencies), consistently acceptable levels of quality, and corporate-wide optimization of communications resources.

a. Use standard line-control procedures for attaching terminals and for interconnecting computers (3270 Bisynchronous migrating to SNA/SDLC).

b. Use standard telecommunications access methods for enabling interactive online communications (VTAM / TCAM migrating to VTAM).

c. Develop a standard methodology, within the overall telecommunications and data access strategies, to access and exchange data between personal computers and other computing devices.

d. Within those locations where the business implements local processing, provide effective communications with process control environments to enable uploading of data and computing capability to process this data. Define standardized communications methodology for tapping process control environment.

3. Establish physical security, data access restrictions, and data integrity measures to insure the privacy and safety of information resources and to provide for the continuity of business operations.

a. Prevent unauthorized access to data and computing resources.

b. Protect data and computing resources from operating failures and catastrophes.

c. Ensure that the creation and updating of critical business data, particularly financial records, can be fully audited and meet corporate and external auditors' requirements.

4. Introduce new information technologies in the context of cost-effective, value-added business solutions.

a. For the purpose of technical system architecture, position the use of new technologies in the slipstream mode (taking advantage of new technologies once the benefits are proven while avoiding the costs and risks associated with pioneering or beta testing of new technologies).

b. For the purposes of application systems architecture, relating to production information and sales support systems technology and communications, position the use of new technologies in the slipstream, leading edge, or even pioneering modes depending on the extent to which the strategic business benefit derived from an application outweighs the respective risks and costs. Leading edge is buying into state-of-the-art very early in the technology's life and assuming the cost of debugging and shakedown in addition to risking technical crib death or cost pyramiding. Pioneering is internally (or as a joint venture) developing state-of-the-art technology and assuming all (or the majority) of the costs and risks.

5. Improve overall reliability, maintainability, and performance of the technical environments (all non-business application software, including systems, telecommunications, and packaged utility software) and operations environments (standards, procedures, software tools, and operations documentation, etc.) by simplifying and standardizing the required information resources.

a. Simplify the technical and operations environments by eliminating or replacing customized, non-vendor supported software and hardware.

b. Improve performance of technical and operational information resources by implementing value-added software and hardware. Manage all new development within guidelines specifying the use of vendor-supported, industry-standard software and hardware.

E. HARDWARE

1. All mainframes throughout the corporation are to be compatible and run common operating systems that enable effective communications, interactive processing, and data transfer. IBM is the mainframe vendor.

2. All mini computers throughout the corporation are to be compatible and enable effective communications and data transfer. The standards are IBM (System 36 and 38) and Hewlett Packard (3000 series).

3. All personal computers are to be compatible (they run the limited set of packaged software) and enable effective communications and data transfers. The standard is "IBM PC Compatible".

V. IMPLEMENTATION ACROSS JAMES RIVER

Because of the diversity of the businesses within James River, the Desired Future State and the Guidelines for implementing the Future State can and will be interpreted somewhat differently by each business. To make the process of implementing management information systems viable across the corporation, the Desired Future State can be separated into three segments:

Applications - the systems that collect, process, and deliver information to end users.

Structure - the foundation and superstructure of the MIS environment made up of various types of data, hardware, technical software and communications facilities.

Organization - the people, skills, and processes required to plan, implement, and maintain the structure and applications.

The rationale for segmenting the Desired Future State stems from the need to logically develop the segments sequentially. The first segment (Applications) is a function of business requirements and is stated in terms of information needs:

What data is required?

What information must be derived from this data?

When is the information required?

How accurate must it be?

Who needs it?

The second segment (Structure) is a function of the applications segment in that optimizing the solutions for data requirements, data flows, and data sharing needs dictates the nature of communications, software and hardware employed.

The third segment, which involves positioning information resources (people, hardware, networking, etc.) within the organization, is dependent on several factors:

- * Applications & Structure
- * Corporate philosophy
- * Variations in MIS skills
- * Management biases
- * Historical perspective - success vs failure

The balance of this paper is a generic description of how these segments could be developed in a James River business.

A. APPLICATIONS

The value of information, the quantitative and qualitative benefits it returns to James River's businesses, is what determines the level of investment in information resources. Value can be generated through the application of information resources in several areas:

1. Improving Customer Service
2. Improving Effectiveness
3. Improving Efficiency

The desired future state of applications in each of these areas is defined in the following sections.

1. Improving Customer Service:

- a. Order Processing

Customer orders are taken over the telephone by customer service staff that have access to online, realtime product, customer, production, and inventory information. This information is accessible on a timely basis, is accurate, and can be used to provide the customer with feedback on his order regarding:

- * availability of product
- * timing of shipment
- * availability of production capacity
- * status of order

Where appropriate, customer orders are received via direct telecommunications between James River's computers and customer's computers. This computer-to-computer link also enables James River to facilitate transfers of order acknowledgements, invoices, etc. to customers.

Where appropriate, customers have access to online, realtime product, inventory, and order information. This information is accessible on a timely basis, is accurate, and

can be used by the customer to independently enter his order or query order status.

Order processing activity interfaces with inventory, production control, shipping, and invoicing processes to update or trigger the required downstream activities.

b. Inventory

Information about inventories at the finished goods, work-in-process, or raw material levels required to support customer order processing is accessible online, accurate, and current.

c. Production Control

Production schedules and available capacity information required to support customer order processing is accessible online, accurate, and current. Where more than one location produces the same product, production schedules and available capacity information for any one of these locations is accessible from any of the other locations.

d. Shipping and Invoicing

Shipping information required to support customer order processing is accessible online, accurate and current. Picklists are generated as a function of customer orders. Invoices are generated as a function of the actual product shipped to the customer.

e. Bar Coding

Product shipped to the customer is labelled with information required by the customer for receiving, inventorying,

warehousing, etc.

- * Data is encoded using bar coding or other machine readable techniques
- * Customer's product code
- * Customer's purchase order number
- * Technical data

f. Competitive Data

Data relating to the activities of James River's competitors is collected, consolidated, and analyzed to determine appropriate James River responses required in the marketplace to maintain targeted customer service levels.

2. Improving Effectiveness

a. Data Accessibility

Data required by line and staff organizations is accessible via simple, end-user driven procedures. The data is in a usable form and can be efficiently accessed in the appropriate manner (online, batch, extract, download, query, etc.).

b. Data Consolidation

Data relating to specific aspects of James River's businesses is efficiently consolidated at the appropriate levels (location, division, group, business, corporate, etc.) and is available to decision makers in a timely, accurate, and accessible form.

- * financial data rollups from division to corporate level
- * customer data consolidations across businesses

- * commodity purchases across businesses
- * personnel data corporate-wide
- * performance data (product contribution, ROA, etc.)
from cost center to corporate level

c. Decision Support Tools

Tools are available to end users that enable them to manipulate, format, change, and process data in support of their decision making processes.

d. MIS Awareness and Skills

End users of information have the appropriate level of MIS awareness and the required set of skills to effectively utilize decision support tools in conjunction with the availability of and accessibility to their data. This level of skills and awareness is the result of an ongoing process which focuses on assessing organizational needs for information and targets education and training specifically at fulfilling these needs.

3. Improving Efficiency

a. Millwide Control

Control systems provide data to manage Mill processes at several layers with each layer passing and sharing data as required. The layers may be defined from top-to-bottom as:

- * Business computer
- * Production control
- * Area control or inter-unit process optimization

- * Unit process optimization
- * Instrumentation/Motor controls
- * Sensors

Data flows up through these layers (and laterally where required) to provide accurate and timely input to Mill operations at various levels. Data is summarized or consolidated where required and is shared and/or accessible by end users who use it to achieve product production and quality objectives.

b. Displacing Labor-Intensive Information Functions

Labor-intensive information functions such as payroll, payables, cash application, cost accounting, profitability/contribution analysis, etc. are automated to enable computer to perform the number crunching while the employee's tasks are reduced, simplified, or upgraded. This automation reduces costs and/or increases productivity.

B. STRUCTURE

1. Data

a. Data Definitions

Definitions of data elements are consistent across divisions, businesses, and corporation as required to accomplish rollup and summaries. The chart of accounts (including costs to a specified level) forms the basis for this consistency in defining data.

b. Common Key Data

Key data is common throughout the corporation.

Key data are those elements of data that logically relate a critical component of the business process to a specific number or code (i.e. customer number 12345 = K Mart). The corporation has common key data in use for the following components:

- * Customer number
- * Location codes
- * Vendor numbers
- * Product codes
- * Commodity codes
- * Common, major stores items
- * Chart of accounts

c. Common Data Structures

Where appropriate, the structure of data relating to specific processes is common. Data structure is the format of individual data elements grouped together to form a record (i.e. payroll records) or the industry standard format of data associated with a specific processing environment (i.e. data interchange format for personal computer data).

d. Common Data Bases

Where appropriate, common data bases contain data required across divisions or businesses or throughout the corporation. Access and use of these data bases is shared among all specified users. Examples include:

- * Transportation - corporate
- * Salaried Payroll/Personnel - corporate
- * Vendor/Purchases - corporate, business, group

* Customer/Sales - corporate, business, group

* Order/Inventory - business, group

2. Communications

a. Communications Protocols and Access Methods

A standard communications protocol is used throughout the corporation where leased data communication lines exist.

Standard protocols are also used for:

- * dial-up access to mainframe processing environments using personal computers or multi-function work stations

- * all computer-to-computer access within James River

A standard access method is used in all mainframe processing environments.

b. External Communications

Data communications with external contacts is accomplished using a flexible front-end into James River processing environments. This accommodates the different communications methodologies of critical contacts such as customers, vendors, etc.

3. Software

a. Interactive Programming Language

A standard interactive programming language is used in all online systems running in mainframe environments. A primary vendor supported language is used in each unique mini environment.

b. Data Base Management Systems

A standard DBMS is used in all high volume, transaction-oriented systems running on mainframes.

c. Operating Systems and Technical Software

Duplicate software configurations are used on all mainframe environments at the operating system and technical software level.

d. Personal Computer Software

A limited set of packages is used to accomplish the primary functions of the PC environment:

- * Spreadsheets
- * Work processing
- * Data base
- * Communications
- * Graphics

e. Information Center Software

A limited set of software tools is used to accomplish the primary functions of the information center environment:

- * End user report writing
- * End user data analysis
- * Application prototyping

4. Hardware

a. Mainframes

All mainframes throughout the corporation are compatible and run common operating systems that enable effective communications, interactive processing, and data transfer. IBM

is the mainframe vendor.

b. Minicomputers

All minis throughout the corporation are compatible with each other, microcomputers, and mainframes, enabling effective communications and data transfer.

c. Personal Computers

All PC's are compatible with each other (they run the limited set of packaged software), minicomputers, and mainframes, enabling effective communications and data transfer. The standard is "IBM PC Compatible".

5. Standards

a. Structure

All aspects of the structural desired future state have specified standards (data, communications, software, and hardware).

b. Security

All data, systems, processing environments, and facilities are safeguarded by the implementation of both physical and data security standards. These standards insure the integrity, continuity, recoverability, and confidentiality of all information resources.

c. Development

Standards are in place for methodologies to provide for compatibility of resources (enabling integration and efficiencies) and consistently acceptable levels of quality. Standard programming languages are used to provide for common-

ality, transferability, and compatibility of applications programs and staff skills.

d. Operations

Operations standards are in place to provide for the integrity of processing operations and consistently acceptable levels of quality in operation methodologies.

C. ORGANIZATION

1. Planning

a. Business Systems Planning

Each business has a process for defining and prioritizing requirements for information resources, coordinating ongoing implementation and changes, integrating these requirements and priorities in support of the business plan, and insuring conformity with the corporate information resources.

b. Corporate Level Planning

Planning at the corporate level consolidates the requirements of the individual businesses and establishes the levels of corporate information resources required to support total business needs. Areas addressed include:

- * Corporate-wide mainframe processing
- * Data and voice communications
- * Technical services
- * Coordination among businesses

2. Development - Staff

Programmers, analysts, and MIS management required to develop and support applications for the business, group, or location report to the appropriate level within the business. MIS core technology specialists report at the corporate level and provide services as required (technical level support for systems using data base, interactive programming, etc.).

3. Technical Services - Corporate MIS Staff

MIS core technology specialists function as a support group within Corporate MIS. The disciplines supported by this group include:

a. Corporate-wide communications services

- * data communications - lines, modems, networking
- * voice communications - lines, switches, networking

b. Technical software support for all mainframe environments

- * operating systems and utilities
- * applications development software (IMS,CICS)

4. Operations - Processing Locations

Processors are positioned throughout the corporation to take advantage of operating and cost-effectiveness factors.

5. End Users

End users possess the MIS awareness and skills required to access and effectively utilize the available data.

VI. CONCLUSION

This proposed structure of MIS for James River is not being written as an academic exercise but rather as a necessary blueprint for providing guidance in developing and implementing data processing systems throughout the corporation.

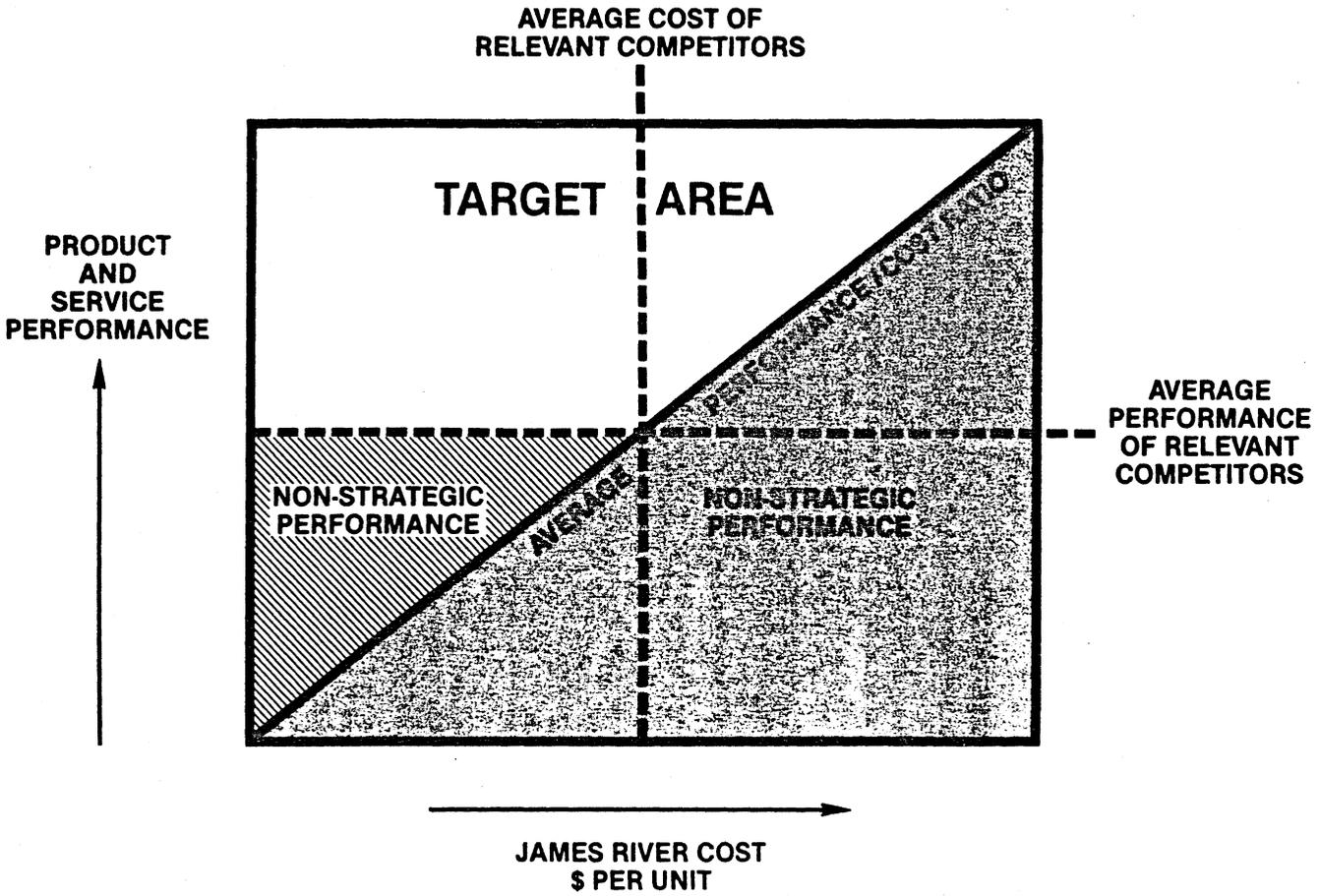
The corporate policy committee has not yet approved, as a corporate MIS strategy, this proposed design. However, parts of this proposal have been implemented (the data communications network and associated protocols), and others are being implemented (the proposed minicomputer strategy requiring communications capabilities with other minicomputers, with microcomputers, and with IBM mainframes) at this time.

This strategy is not intended to be hard cast and inflexible. As the environment upon which the strategy is based changes, the strategy must be adjusted accordingly. Only in this manner can MIS resources evolve in response to business needs.

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TARGET AREA



APPENDIX 1

BUSINESS EXECUTIVE INTERVIEW QUESTIONS

1. What Business are you in?
- Profile the Business
2. What are your Short-term Goals?
3. What are your Long-term Goals?
4. How do you plan to achieve these goals?
5. What role does MIS have in helping you achieve your goals?
6. What are some MIS Opportunities--
Short-term?
Long-term?
7. What are some MIS problems--
Short-term?
Long-term?
8. How are decisions made in your Organization
(trying to understand the process, not critiquing it)?
9. How do you assess MIS performance today?
What's good?
What's not so good?
How can MIS improve?
10. Approximately what do you spend on MIS today?
How much do you want to spend in the future?
How much can your business afford?
11. What are your competitors doing in MIS?
Any competitive advantage--us or them?
Who are your major competitors?
12. Do you need information from or provide
information to outside sources?
Any MIS requirement?
13. Are there any major Regulatory/Legislative Impacts
on your business?
14. What would you like MIS to do for your Business?

Appendix 2

HARDWARE LOCATIONS

	MAIN FRAME	S/38	S/36	S/34	HP-3000
Richmond, VA.	X (2)				
Kalamazoo, MI.	X (1)		X (1)		
Norwalk, CT.				X (1)	
Specialty Papers Business			X (3)		
Communication Papers Business		X (1)	X (5)		
Towel & Tissue Business				X (2)	X (3)
Dixie Products Business				X (4)	X (4)
Paperboard Packaging Business			X (6)		

MIS PRIMARY OBJECTIVES

In support of the Corporation's Strategy Statement and the MIS Mission the primary objectives of MIS and James River are to:

- A. Provide the businesses with consistently acceptable levels of service by effectively utilizing technology and developing "staff personnel who understand James River's business and apply their skills with a continuous eye toward (internal and external) customer needs".

- B. Provide services at lowest cost possible by maintaining "a dedication to exploring uniquely cost-effective approaches to problems and opportunities" while maintaining the required levels of service.

- C. Assist the businesses in identifying new areas to effectively apply MIS services consistent with business objectives and James River's strategy to "place extraordinary emphasis on support programs" including "Product Information and Sales Support Systems Technology".

Appendix 4