

**Human Resource Information Systems for
Competitive Advantage:
Interviews with Ten Leaders**

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Human Resource Information Systems (HRIS) for Competitive Advantage:

Interviews with Ten Leaders

Counts of applications and descriptions of hardware and software dominate literature on HRIS. In-depth interviews with corporate systems groups in ten firms considered leaders in HRIS add details and insights. Current and future differences in HRIS across firms are viewed as competitive according to a framework that draws on theories of information value and organizational contingency.

Increasingly, today's organizations use computer technology to manage human resources (HR). Surveys confirm this trend (Richards-Carpenter, 1989; Grossman and Magnus, 1988; Human Resource Systems Professionals 1988; KPMG-Peat Marwick, 1988). HR professionals and managers routinely have Personnel Computers (PCs) or computer terminals on their desks or in their departments. HR computer applications, once confined to payroll and benefit domains, now encompass incentive compensation, staffing, succession planning, and training. Five years ago, we had but a handful of PC-based software applications for HR management. Today, we find a burgeoning market of products spanning a broad spectrum of price, sophistication, and quality (Personnel Journal, 1990). Top universities now consider computer literacy a basic requirement for students of HR, and many consulting firms and universities offer classes designed to help seasoned HR professionals use computers in their work (Boudreau, 1990). Changes in computer technology offer expanding potential for HR management (Business Week, 1990; Laudon and Laudon, 1988).

Yet these facts do not explain how HR uses computer technology, how HR is implementing that technology, or, for that matter, its costs and benefits. True, there exists a literature describing the use of computer technology in a variety of manufacturing, engineering, and office settings. That literature examines the objectives of organizations in adopting technology, the design decisions made, the social aspects of implementation --the changes in organization hierarchy, job design, and skills that often accompany implementation-- and the need for employee acceptance and understanding in realizing computer technology's potential (Huber, 1990; Walton, 1989; Majchrzak, 1988; Markus and Robey, 1988). However, with few exceptions

(Kavanagh et al., 1990; Lee, 1986; Walker, 1982), the academic and professional literature on Human Resource Information Systems (HRIS) offers no comparable examination. To date, this literature has been dominated by counts of applications and hardware, descriptions of software, and lists of the "ten guidelines you should consider in developing (HRIS)".

Ideally, HRIS research would yield a framework that helps HR managers develop computer systems to add value to their organizations, and that shortens the learning curve of computer implementations by identifying the technical and social dimensions of success. In our judgment, developing this framework demands information beyond that now found in the HRIS literature. In order to collect richer information and gain the insights on which such a framework might be intelligently based, we conducted interviews, in 1989, with corporate HRIS groups in ten Fortune 500 firms: Aetna, ALCOA, Armstrong World Industries, Becton Dickinson, Chevron Corporation, Data General, Digital Equipment Corporation, Mobil Oil Corporation, and NCR.

In the following six sections we summarize interview findings and our interpretation of them. First, we describe firm selection and interview procedures. Second, we propose a framework for interpreting the different HRIS investments we observed. Third, we describe the nine dimensions of successful HRIS development common to the firms we interviewed. Fourth, we examine two distinct profiles of HRIS development, also drawn from our interviews. These profiles illustrate how our proposed framework can help explain organization differences on the nine dimensions of successful HRIS development. Finally, we describe a future profile of HRIS, and offer some suggestions for research.

Throughout this paper, we define human resource information systems or HRIS to represent the composite of databases, computer applications, hardware and software necessary to store, collect/record, manage, deliver, present, and manipulate data for HR management.

HRIS INTERVIEWS: INFORMATION FROM INDUSTRY LEADERS

We selected ten firms to interview from among the 40 members of the Center for Advanced Human Resource Studies (CAHRS) at Cornell. We based our selection on recognized leadership in the use of at least one aspect of computer technology in HR management. To identify leadership, we reviewed published articles on notable firm applications of computer technology in HR, and we contacted CAHRS sponsors to solicit peer recommendations.

We spent one day on-site at each firm, taping interviews with the top HR manager, the top HRIS manager and staff, and others in Information Systems or Payroll who regularly worked with HRIS. Our interviews covered a broad spectrum of questions: 1) current market environment and firm strategy; 2) the firm's structure, computer technology, management, and work force; 3) the firm's HR policies, practices, and work force; 4) detail on the HRIS organization; 5) the evolution of HRIS; 6) detail on HRIS applications; 7) detail on HRIS management and implementation; and 8) the future of HRIS in the firm. We viewed demonstrations of HRIS applications, and collected documents such as annual reports, organization charts, HRIS architecture charts, database models, training manuals, and descriptions of applications. Information collected in these interviews was then summarized and sent to the major interview participants for verification.

GOOD HRIS INVESTMENTS ADD VALUE AND MATCH CONTINGENCIES

We propose that successful HRIS development represents a good investment when it creates information value for the firm. Differences in a firm's investments in HRIS will reflect differences in the firm's estimations of information value. These estimations are contingent on factors such as strategic goals, technology, structure, management style, and the nature of the work force.

The Value of Information

HR managers must gather, process, and use information; computers help them do so. Computers improve on the calculators and paper filing systems of

the past by making information more widely available, more quickly, more accurately, and more comprehensively --but only at some cost. The question is whether such improvements are valuable enough to justify their cost. For HR, information has undeniable value when it: (1) protects the organization from costly penalties because certain government agencies require it, or (2) improves HR decisions with consequences important enough to justify its cost.

Meeting government requirements has motivated the vast majority of HRIS initiatives. Payroll and benefits are typically the first HR activities to be computerized, primarily because they involve information needed to satisfy specific financial and legal obligations. Computerizing these activities adds value when the required information is delivered more accurately and more cheaply than with manual systems. Cost savings can include fewer administrators, less mailing, less paper, and so forth. The "paperless" HR office concept is often driven by the desire to computerize all required reports so that HR managers can produce them more easily, quickly, and accurately.

Improving managerial decisions is a less recognized benefit of HRIS, but one with potential effects far more revolutionary than those of the "paperless" office. For example, computers make it more feasible to collect, track, and analyze the information needed for organizational decisions such as executive succession planning. Computerizing such information adds value if it improves decisions enough to offset costs. Its value thus depends on three factors: 1) how frequently the information will improve a decision; 2) the consequences or importance of the improved decision; and 3) the costs of providing the information (Boudreau, 1990).

An Example of Information Value-Added

Consider a computer application that supports job evaluation. Suppose analysts mis-evaluate at least 20 jobs each year due to outdated information. The result is an unwarranted \$2,000 annual increase for 10 job incumbents, and it takes two years to discover this mistake. Each mis-evaluated job thus costs \$40,000 (10 employees * \$2,000 * 2 years), so correcting each mis-

evaluation (factor 2 above) will save \$40,000. We know that a computer application can correct 18 of the 20 mis-evaluated jobs (factor 1). Developing this application incurs initial costs of \$700,000; maintaining it will cost \$60,000 per year (factor 3). If we evaluate the new computer application over five years, its total cost is \$1 million (or, \$700,000, + (5 * \$60,000)).

The yearly value of this computer application is simply the number of decisions corrected each year (18) multiplied by the value of each corrected decision (\$40,000), or a yearly value of \$720,000. Over a five-year period, it will provide roughly five times this value, or \$3.6 million dollars, at a cost of \$1 million. This is a substantial return or value-added for the computer investment. It would pay off were the new system's costs substantially higher, or the number of corrected decisions or the value of each corrected decision, lower. This is a simple example, and the numbers for the necessary computations were assumed available. But the principles apply to more complex decisions or to decisions where the numbers are less easily identified.

Some computer applications add value by correcting a large number of decisions, each with relatively minor consequences. For example, automated employee benefit and payroll information kiosks affect thousands of employee decisions each month, though each corrected decision may have consequences of under \$100. Other applications add value by correcting a relatively small number of strategic decisions. Executive succession planning systems, for example, may be used only once or twice each year, but if they help decision makers chose better candidates for top corporate positions, the consequence of each improved choice may be millions of dollars. HRIS investments, like other investments, can be evaluated according to their costs and benefits.

This value-added framework suggests that HRIS investment decisions be made with several questions in mind, such as:

- o What HR information must be collected and reported; can computers improve this process?

- Which key decision makers in the organization could benefit most from HRIS decision support?
- Should future investments in HRIS focus on improving infrequent, but important strategic decisions (such as the right level of contract labor to supplement the core work force), or should they focus on improving frequent decisions that each have a small impact (such as correcting individual pension record changes)?
- For which HR tasks can computer systems achieve the greatest cost reduction; are these tasks critical to organizational goals?
- Could computers reduce information costs enough to make the development of applications to support strategic or tactical decisions worthwhile?

Contingency Theory Contributions

Difference in firms and the competitive environments they face presumably influence their estimates of information value and their identification of key decision makers. Contingency theory suggests that environmental uncertainty and specific organization factors -- technology, size, business strategy, structure, centralization, the nature of the work force, and so forth-- define which information provides the most value added and thus which decisions should be computerized (Galbraith, 1977; Galbraith and Nathanson, 1979). Several veins of business policy research suggest that firms in more dynamic environments featuring multiple competitors, continuous new product introductions, and short product cycles, are more likely to perform well under decentralized management; the opposite is true of high performing firms in comparatively more stable environments (Lawrence and Lorsch, 1967; Khandwalla, 1973; Miles and Snow, 1978; Govindarajan; 1986; Miller, 1988). These findings suggest that firms succeeding in the face of very short product cycles and the need for continuing new product introductions (such as many electronics firms) might consider business unit managers their most critical decision makers, and that computer support for business unit decisions would provide the most value added. Similarly, firms succeeding in more stable environments that reward technical and administrative efficiency (such as durable goods manufacturing) might centralize more decision making power in corporate management and staffs, thus making computer support for these decisions the value-added choice.

The demands of the competitive environment, and a firm's centralization, both influence the decisions thought to have the most consequence for the firm. However, other organization factors can influence HR computerization decisions. For example, the computer technology already available within the firm will influence the cost of HRIS development. A firm where mainframe power is more readily available to HR, and where the Information Systems (IS) staff is large enough to support HR computer needs, might find internal, mainframe HRIS development more cost effective than a firm where the mainframe can be readily used only for payroll and employee recordkeeping. The latter might develop HRIS around PCs and vendor applications. Similarly, a firm in which many HR people have analytical training might develop more computer applications to support complex decision making, and generate more HR community support for HRIS with fewer organizational development costs than a firm where HR people have less analytical training.

Environments, strategies, and structures also evolve and change over time. In order to deal effectively with global competition, for example, many highly centralized firms endeavor to couple the efficiencies of centralization in areas such as production, R&D, and advertising with the flexibility and responsiveness offered by more local input and decision making in areas such as sales and service. Likewise, highly decentralized organizations try to maintain the advantages of local decision making while pursuing the efficiencies possible with some centralization (Porter, 1985). We expect HRIS to evolve and change with a firm's strategy, structure, and centralization.

In short, contingency theory predicts that HRIS investments add the most value when they provide information supporting the firm's current patterns of centralization and its identification of key decision makers, or proposed changes in these factors.

NINE DIMENSIONS OF SUCCESSFUL HRIS DEVELOPMENT

The HRIS groups we interviewed described the success of their systems in many terms: more HR related work accomplished with lower HR headcount; more

cost effective administration of benefits and recordkeeping; more accurate, timely responses to government or management initiated changes (for example, acquisitions, changes in merit plan administration, changes in IRS regulations); faster diagnosis of HR problems; increased HR computer literacy; increased HR computer utilization; better review and rationalization of existing HR programs; more consistent understanding and communication of HR policies; and more consistent HR practices across the organization.

Though there are many descriptions of HRIS success, our interviews did reveal nine development dimensions that all ten firms considered important to achieving success. These dimensions are listed in Figure 1. The first four reflect decisions about computer systems, and the HR decisions and decision makers those systems should support. The second five reflect organizational development factors that influence successful HRIS implementation.

System Development Dimensions

System Information Coverage

Figure 2 depicts major HR information coverage decisions --decisions concerning the information on HR activities, employees, and firm locations that should be electronically available to support HR decisions. The more comprehensive the system coverage, the more potential applications the information can support, and the broader the range of HR decisions that can be integrated across locations, time periods, or HR functions. Comprehensive information coverage pays off most when key decisions involve broad, policy or strategy issues, and when computerizing relevant information will improve these decisions. For example, policy decisions about training investments can be improved with computer applications that help test investment alternatives. However, without relatively comprehensive information --on training enrollments, completions, costs, and post training performance for all relevant employees, firm-wide-- computer assisted improvements in training investment decisions might be marginal. Less extensive coverage saves

resources, and is more appropriate when key decisions involve focused, local HR issues.

System Availability

Figure 3 depicts HR system availability decisions. These involve questions about the numbers and levels of HR and non HR employees with access to HR data, the geographic dispersion of systems access, and the types of information use authorized. Extensive systems availability allows HR decisions to be made by those closest to the issues, potentially saving time and resulting in better decisions. Extensive availability also increases the number of decisions that can be improved, so that each improvement need only have a modest impact for widely-available computer systems to add value. For example, making an application that assists pension plan choices available to all employees can result in better choices, lead to more accurate and timely reporting of choices, and cover a volume of choices high enough to make the application pay off.

System Decision Support

Figure 4 depicts a range of computer applications that support different levels of decision making. The computer applications at the top of Figure 4 support relatively simple, routine HR decisions. They are most valuable for routine data collection, processing and storing activities such as payroll and employee recordkeeping, because they reduce or control associated administrative costs. Moving downward in Figure 4, the listed computer applications support increasingly complex decisions-- decisions that require expert knowledge, or analysis of information to recommend tactical or strategic actions. These applications are often costly to develop. In the case of expert systems, application development involves modeling more complex sets of rules and decision alternatives than is typical in routine recordkeeping. In the case of tactical and strategic decisions, applications must support exploratory modeling of connections between HR and business decisions. However, because expert and strategic HR decisions can have

important competitive consequences for the firm, the cost of computer applications that improve these decisions can certainly be justified.

System Engineering

According to Laudon and Laudon (1988) there have been two basic approaches to engineering and managing systems. The older approach focuses on information processing. Under this approach the capabilities of the firm's existing computer technology dictate systems management. More recently, an approach centered on the firm's information needs called "information engineering" has emerged. Systems management under an information engineering approach is dictated by the firm's need for information and decision support. Information engineering requires firm-wide participation to identify HR information needs, and adherence to firm-wide standards for defining and maintaining this information. Figure 5A illustrates a fundamental difference in the systems designs typical of information processing versus information engineering approaches to systems management. With an information processing approach, standalone databases are built for single applications. With information engineering, integrated databases reflect firm-wide views of relevant HR information and applications.

Information engineering approaches have several advantages. They enable users to tap a broad range of HR information to adjust to changing demands. For example, benefit regulations change regularly. With a comprehensive, integrated HR database, benefits applications can be quickly adjusted to new information requirements by drawing the right information from integrated databases. This contrasts with the information processing focus, under which both the benefits database and related applications must be adjusted to accommodate changes in regulations. Integrated databases make applications to support policy decisions feasible by enabling users to examine and model comparable information from many HR functions. They also make it easier to maintain reliable standards of data quality and security, because the necessary auditing programs can be applied to the entire database, rather than

piecemeal, to independent databases. High quality data is important for applications such as those used for payroll or benefits administration.

Integrated HR databases, however, are not all alike. Their core designs vary, and these variations can influence the value of the information that HRIS provides to the HR community and the firm. Figure 5B illustrates two major variations in integrated database design. The first is a networked design in which all HRIS data are stored according to the logic and frequency with which the information is used (Laudon and Laudon, 1988). The design of networked databases involves balancing the structure that best meets many common user requests with the need to use the computer's power to store, process, and access information most efficiently. Because such balancing requires relatively sophisticated programming skills, networked designs do not easily accommodate unanticipated user requests. They do, however, offer superior control over data quality and security. To date, they are the most technically efficient designs because they minimize redundancy, as well as storage and processing requirements. These are important considerations for processing high volume HR decisions such as those typical of payroll and benefit administration.

The second HRIS database design is relational (Laudon and Laudon, 1988). It involves storage of HRIS data in multiple tables or files linked by common elements (such as an employee ID). Individual tables or files might be dedicated to the information needed to answer questions typical of specific HR activities --for example, questions about an employee's pay history-- but information from any number of tables can also be relatively easily combined to answer unexpected questions --such as questions about the relationship between in-house training and pay history. New information can be easily added to relational databases, as the entire database structure need not be retuned to accommodate it. Relational database designs are thus more flexible and user friendly than networked designs. The major disadvantages of relational designs are their inefficiency. Multiple files mean more redundant

data and more computer space and time spent in storing, accessing, and updating data, and in maintaining data quality and security.

Organizational Development Dimensions

Building Human Resource-Information Systems Bridges

The groups we interviewed believed that the value of HRIS for the firm is enhanced if the outlooks and skills of both HR and Information Systems (IS) people are effectively combined in the HRIS organization. HR people who have established credibility with the HR community and understand its needs should direct HRIS developments. IS people who understand computer technology and have been trained in analytical approaches to problem solving should help shape and fine tune these developments.

Among the ten firms we interviewed HR and IS bridges had been built via staffing and training investments. Typically, there is an independent HRIS organization. It reports through HR, and is managed by credible, high level HR people. The HRIS staff assigned to provide client service and training to the HR community represents either HR people with some IS background, or IS people who understand HR work. The IS staff assigned to develop HR databases and applications receives "on-the-job" training via repeated development assignments in one or two HR areas (such as compensation, staffing or benefits). Such training is viewed as strengthening the match between HR user needs and existing technology, and cutting system development costs.

Several HRIS groups also emphasized the importance of IS technical retraining. They noted that people with traditional mainframe IS skills require training for flexible, distributed technology, smaller projects, and for helping HR users identify and define their system needs. One HRIS group insisted that HR people understand basic computer and database design concepts, to improve user development of HR applications.

Building Human Resource-Payroll Bridges

Payroll systems must efficiently accommodate high volume data, subject to specific regulations and customer demands. HR, on the other hand, often

requires more service oriented, flexible systems to meet unpredictable, sometimes vague customer requests. These differences in customer and information needs often lead to different preferences for software, staff skills, and work procedures. But there are overlaps in the data required by HRIS and payroll --for example, in benefits, salary administration, and personnel recordkeeping. In firms where all payroll work is done internally, and where HRIS are well established, these overlaps mean pressure to integrate payroll and HR systems --usually under HR control. Integration of payroll under HR control (typically away from Finance) requires a transition period in which new reporting and working relationships are established. It is especially important that the systems and skills needed to meet payroll demands for reliable high quality, high volume data processing make it through the transition.

Among the ten firms we interviewed, five retained independent payroll and HR systems. Four used highly interfaced systems --that is, the two systems were independent, but with considerable interaction and updating of databases and transfer of information from one set of system applications to the other. Only one firm had completely integrated payroll and HR systems. Firms with either interfaced or integrated systems made substantial investments in joint interaction, cooperation, team building and the development of good will between payroll and HRIS organizations.

Building HR Community Motivation

Several HRIS groups stressed that realizing computer technology's potential for HR requires building the HR community's motivation to use HRIS --from top managers to entry level administrators. HR leaders must stress the importance of HRIS in meeting important goals. They need to recognize the changes that heavier dependence on HRIS can bring about in current HR roles, and deal with the insecurities that may result. For example, HR people in business units traditionally administer HR policy day to day, 'fight fires', and manage unit employee relations. What will the payoffs for using HRIS to support a more analytical, business management role be? What will happen to

the people who cannot handle this role? What if line managers do not want their HR people to be more analytical? These issues must be addressed by top HR managers if the use of HRIS is to mesh with day-to-day HR activities in the business units.

All the HRIS groups we interviewed believed that communications, rewards, and performance objectives should reinforce the importance of HRIS in both routine and higher level HR decisions. They noted that communications, in particular, should account for possible HR resistance to HRIS, promoting current HRIS contributions without overselling them.

Building HR Community Knowledge

Most HRIS groups agreed that HR community training is critical to the success of HRIS. The ideal is training designed to increase HR users' basic computer skills, to showcase the range of computer applications that can support different levels of HR decision making, and to introduce and build skills for the actual systems available. Time for users to experiment and gain confidence with applications is also crucial. Yet, despite virtual unanimity in these views, only two of the ten firms we interviewed had invested in training beyond that required for the installation of a specific computer application. We often asked, "If you could magically have your ideal hardware, software, databases, and applications in place tomorrow, would all your HRIS investments really pay off?" The answer was often "No", and the reason was that only a few HR people would have the skills needed to fully utilize HRIS.

Building HR-Organization Technology Links

Many firms stressed the importance of developing and continually reevaluating HRIS technology strategy. Decisions on whether to make or buy software, on standards for compatible hardware, software, and communications systems, on further investments in mainframe or network technology, on the nature of staff training needs, and so forth --all influence the strategic balance between today's HRIS needs and tomorrow's HRIS potential. Several firms also emphasized the need to integrate HRIS strategy with the

organization's overall technology strategy. More business oriented, strategic HR decisions will require information from areas outside HR (finance, marketing, etc.). HRIS technology that is compatible with the rest of the organization can enhance HR's ability to exchange this information and engage in joint decision making. HR can follow the overall organization strategy or can choose to influence the organization's technology strategy. The point is to choose, not react.

TWO PROFILES OF HRIS DEVELOPMENT

The ten firms we interviewed had some HRIS investments in common. During the 1970s, they made basic investments in mainframe HRIS for payroll, benefits, employee recordkeeping, and government reporting. Typically the resulting databases and applications were simply additions to payroll, and, in many ways, unsatisfactory. Nevertheless, they did improve HR's ability to meet government reporting requirements and keep track of employees. All the firms had appointed a corporate level HRIS group. Some reported directly to top HR management; others reported through Compensation and Benefits.

Beyond this common core of payroll related mainframe investments, however, the ten firms could clearly be divided into two groups based on their investments in computer technology. Four firms developed their HRIS around mainframe technology; the other six used a combination of mainframe, mini-computers, and PCs. Undoubtedly, these differences were influenced by the dollars and the computer technology available at the time these firms began HRIS development. Mini-computers were not readily available until the early 1980s, and PCs became less expensive by the mid 1980s.

The two profiles described below reflect this mainframe versus PC divergence. But there are other differences. While the nine dimensions of successful HRIS development described above cut across all the firms we interviewed, the firms did differ in their level of investment on each dimension. We propose that these differences can be viewed as an overall pattern that reflects an understanding of information value and organizational

contingencies. We describe a pattern for each profile, and we use differences in investments on the nine dimensions of successful HRIS development to illustrate the pattern.

Profile One: Large-Scale, Mainframe, Centralized HRIS

"Profile One" firms were in industry environments considered relatively stable (such as durable goods manufacturing, insurance, and petro-chemicals). They prospered by virtue of their size and their technical and administrative efficiency --especially during the mid to late 1970s when many of these firms began investing in HRIS. At the time of these investments and well into the 1980s, these firms pursued a corporate market strategy that focused on maintaining competitive position --in market share, in profit margins, and in other comparative industry ratios. This strategy places a premium on management's doing what it already knows how to do ever more efficiently and productively. Profile One firms were managed in a centralized, hierarchical fashion. They had invested in mainframe computers and in people with Information Systems (IS) skills to manage many aspects of their business. The skills of the corporate HR community in these firms have traditionally been highly specialized, involving either advanced degrees or substantive firm experience in a particular HR function (compensation, benefits, staffing, etc.). The traditional role of corporate HR has been one of providing efficient administrative support, setting policy, and establishing the corporation's public image as a "good corporate citizen". The business unit HR people have been mostly employee relations generalists with predominately labor relations experience.

From the mid 1980s to date, many Profile One firms have faced strategic, structural, and management changes. In order to improve quality, customer service, and market responsiveness, many firms are selectively decentralizing. For example, many are delegating more marketing decisions to business units. The more traditional, employee relations role of business unit HR people is also changing. HR employees are being asked to contribute more directly to HR

policy and other business decisions in their units. This shift in strategy and HR roles calls for more emphasis on the needs, abilities, and motivations of HR business unit people in using HRIS.

The general pattern of HRIS development observed in Profile One firms is consistent with contingency theory and information value added principles. The centralization of Profile One firms and their emphasis on efficiency suggests that HRIS support of HR corporate decision makers would add the most value to their businesses. Corporate HR decision makers are typically responsible for major administrative programs such as benefits, compensation, and recordkeeping, as well as policy development. Building on existing mainframe technology and IS skills, Profile One firms have a pattern of HRIS investments in comprehensive mainframe databases and applications that supports these corporate HR decision makers. As these firms decentralize, some shift in HRIS investments to support business unit decision making would be expected. A review of the decisions that Profile One firms made on the dimensions of successful HRIS development further illustrates how contingency and information value added principles can guide HRIS investments. Figure 6 summarizes these decisions.

Profile One Investments on System Development Dimensions

As Figure 6 illustrates comprehensive system coverage of HR information and extensive availability or employee access to it are typical of HRIS in Profile One firms. The HRIS databases typically cover information on all categories of employees; all domestic parent company locations and any domestic subsidiary locations with comparable HR programs; a broad range of information related to all the HR programs currently operating in the parent company; and as much history as possible. Many firms are now adding selected information on foreign subsidiaries. Mainframe HR information is available to corporate and business unit HR employees throughout the firm via connections with PC or free standing terminals. Authorized HR employees can capture and update data on their unit's employees, get information to answer the HR questions of managers and employees, and produce reports. In several firms,

individual employees --including top executives-- can access HR information through specially designed applications (Employee Direct Access or Executive Information applications).

On the System Decision Support dimension, Figure 6 shows that Profile One firms have invested most heavily in the transaction processing, office automation and tracking systems that support HR administration of payroll, compensation and benefit, and other recordkeeping and reporting activities. Transaction processing applications enable HR units to capture and update data, do program calculations (for example, calculate changes in savings plan earnings potential under different investment options), and produce summary lists and reports. Tracking applications enable users to trace turnover, accident and sickness, absenteeism, daily time cards, career potential ratings, and so forth. Profile One firms have also developed Employee Direct Access applications which provide a simple expert system environment for employee questions about pension investments, flexible benefit choices, or relocation decisions. Executive information applications which allow top executives to easily answer their HR questions are also being developed.

In System Engineering, all Profile One firms viewed HR information as a corporate resource and had used information engineering approaches to HRIS database development. All had integrated, mainframe HRIS databases and applications. Two firms had hierarchical or networked database designs; two had relational designs. All firms had invested heavily in software to maintain data quality and security. All were exploring improvements in software that would allow them to use relational database designs more efficiently.

We propose that the pattern of these system development decisions is consistent with Profile One firm contingencies and an information value added perspective on HRIS investments. The relative centralization and emphasis on efficiency characteristic of Profile One firms suggests that HRIS support of HR corporate decisions makers would add the most value to these businesses. Comprehensive HR databases offer a potential wealth of information to

corporate managers and top executives. Once they realize this, they soon ask for information summaries and for reports tracking deviations from goals. Such requests drive development of more analytical applications --such as modeling, forecasting, and expert systems-- that help corporate users shape the best HR policies for their firms. Although the decisions involved in shaping HR policies may be infrequent and small in number, their impact can be substantial. Improving them may provide a competitive edge for the firm. Extensive availability can improve the accuracy and timeliness of individual, but high volume decisions. For example, Employee Direct Access systems can enable thousands of individual employees to make better choices about their benefits and report those choices quickly and accurately.

The emphasis of Profile One firms on investments in decision support systems such as the large-scale, transaction processing applications most valuable for automating payroll and benefits processing and reporting also make sense from contingency and information value added perspectives. In the relatively centralized Profile One firm such activities are the responsibility of corporate-level managers. Mainframe transaction processing systems can reduce the costs of administering these programs while improving accuracy and timeliness.

The system engineering choices of Profile One firms are also consistent with our interpretive framework. The initial focus on key corporate decision makers and their information needs led naturally to a view of HR data as a corporate resource and to an information engineering approach to HRIS management. The emphasis on hierarchical or networked database designs and software to protect data quality and security is consistent with investments in mainframe transaction processing systems (payroll, benefits, etc.). These require high data quality to pay off. Increasing interest in relational database designs may also signal a change in contingency factors such as a trend toward more decentralized management. Relational database designs can make HRIS information more accessible to a broader range of users. This may be especially important for business unit users who are less likely than

corporate staff to have the programming skills (or easy access to people with these skills) needed to effectively tap information from hierarchical and networked database designs.

Profile One Investments on Organizational Development Dimensions.

We propose that Profile One investments on organizational development dimensions have also been consistent with their centralized management style, its resulting focus on corporate HR decisions makers and their analytical staffs, and HRIS investments in mainframe computer technology. Again, Figure 6 summarizes these investments.

All Profile One firms have independent HRIS organizations which are directed by someone with HR experience and credibility. Most have large staffs of between 70 and 200. Without exception, these firms have devoted considerable resources to building HR-IS and HR-Payroll bridges. Presumably, the dominance of mainframe technology and the tight interface between HR and payroll systems typical of these firms demands investment in IS and payroll staff skills to effectively carry out the work of the HRIS organization. Rather than training HR people in IS concepts, Profile One firms use people with IS skills to handle the development of HR computer applications, to answer user requests, and to conduct training. These IS staffs receive 'on-the-job' training to learn about HR. For example, they might work exclusively with a few HR functions (such as benefits and compensation), thus learning the client needs in detail. Links between HR and organization technology strategies are also strong in Profile One firms, though they vary in their emphasis on internal versus vendor-based software and applications development for HRIS. In most firms there is a standing committee (including HRIS representatives) assigned to evaluate new technology, make long term plans for organization technology investments, and develop computer technology standards for the entire firm. HRIS does not always follow the rest of the organization in its technology choices, but typically makes compatible choices.

Until recently, Profile One firms had made only rudimentary investments in building HR community motivation to support HRIS. For example, top

management might simply announce that "unit X had gotten on the bandwagon and really improved their HR administrative efforts by using the HRIS". Even this level of motivation building was rare. In most Profile One firms, the HR community was expected to use HRIS by fiat, and held responsible for the results. Similarly, HRIS knowledge or training investments were targeted to specific applications and their use. Users were shown how to use relevant applications when they were implemented, and provided some documentation and "trouble shooting" services. Few attempts were made to provide users with any broader understanding of systems and their potential to help them in their work.

We speculate that the motivation and involvement of the entire HR community has not been critical to the success of centralized, large scale mainframe HRIS systems in Profile One firms. Their focus has been on supporting corporate decision makers who had already identified the need for computer support in payroll, benefits, compensation administration and government reporting. These decision makers could turn to their staffs to do more sophisticated analyses, so HR did not have to worry about motivating and training the broader HR community. Changes in business strategy and decentralization of management decision making over the last few years have led several Profile One firms to become more concerned about the HR community's motivation and its ability to utilize HRIS potential.

Summary of Profile One HRIS Investments and Key Successes

Profile One firms have invested most heavily in HRIS to support corporate decision makers. They report that their investments in comprehensive HR databases, transaction processing and reporting applications, information engineering, and strong bridges with IS and Payroll have provided effective corporate support. HRIS has reduced the cost and improved the accuracy of payroll and compensation and benefits administration, employee recordkeeping, and government reporting. The wealth of information available in HR databases, combined with the analytical skills of some corporate staff, has meant better support for strategic policy decisions. Finally, the

investments in system availability --PCs or terminals throughout the firm and user friendly applications such as "Employee Data Access" programs-- have enabled users firm-wide to utilize HRIS and recognize its value.

HRIS investments in comprehensive coverage, extensive availability, and integration are expensive, but can complement one another and justify the initial development expenses. In general, the broader the range of HR information covered, the higher the probability of improving a range of HR decisions --from the routine to the strategic. Likewise, the more HR information is made available to users, the more they will understand its value and utilize it to make HR decisions. Recognizing this, and consistent with the decentralization of more decision making to business units, many Profile One firms are now taking steps to assure that the maximum number of employees --especially business unit HR people-- want to use, can use, and do use HRIS. In short, Profile One firms want to make their HRIS more responsive to user needs without seriously compromising the computing power, economies of scale, and quality of their centralized system investments.

Profile Two: PC-Based, Distributed Systems

Profile Two firms were most often found in industry environments considered relatively uncertain and rapidly changing (such as electronics manufacturing); environments in which innovation is required and short product cycles are common. Each business unit has defined its own approach to the market, and has development, and profit and loss responsibilities. This decentralized strategy means that the influence of business unit line managers rivals that of corporate staffs. Corporate staffs --in all functional areas-- are much smaller and more resource poor than in Profile One firms. HR business unit people are more business oriented and more analytically trained than in Profile One firms. Their role has been more that of business partner with line management.

The intensified competition of the late 1980s has increased demands on Profile Two firms to centralize previously independent business activities, to

achieve some efficiencies of scale. In turn, this has generated demands for more centralization and integration of HRIS databases and applications, and recognition of HR information as a corporate resource --a resource critical to optimizing policy decisions and facilitating joint decision making across functions (marketing and HR) at the business unit level.

The HRIS development seen in Profile Two firms is consistent with our contingency and information value added framework. Their degree of decentralization suggests that HRIS investments should support the HR business unit managers and staffs. Business strategies place a premium on HRIS flexibility and contributions to unit level activities such as employee performance, recruitment, and training. The more technical, analytical orientation of HR staff in Profile Two firms suggests that they could use computer applications to support these activities, and to model, forecast, and diagnose related problems. They could also generate new ideas for HRIS development. Relying heavily on mini-computers and PCs, Profile Two firms have developed a broad range of independent HR databases and applications to support the HR needs of the business units. As these firms centralize some business functions to achieve firm-wide economies and support long term strategies, the pressure to integrate and expand HRIS databases and applications increases. A review of the decisions that Profile Two firms made on the dimensions of successful HRIS development further illustrates how contingency and information value added principles can guide HRIS investments. Figure 6 summarizes these decisions.

Profile Two Investments on System Development Dimensions

On System Information Coverage and System Availability dimensions, Profile Two firms have less comprehensive information coverage than Profile One firms. Profile Two firms have developed multiple, independent HR databases. Each database is specific to a particular HR activity --payroll, employee recordkeeping, college recruitment, job evaluation-- and may also be limited to a restricted set of employees, firm locations, and time periods. Systems availability, however, may rival that of Profile One firms. Specific

databases and applications are available to all relevant HR users via diskettes provided to workstations or individual PCs. Several firms have Employee Direct Access applications that are available to employees at workstations or on diskette.

On the System Decision Support dimension, Profile Two firms are notable for the range of HRIS applications they have developed and the breadth of HR business unit decisions these applications support. HR business unit staff often have applications that cover the entire range of potential decision support from routine transaction processing to relatively sophisticated expert systems. For example, one firm initially focused on applications that enabled HR business unit and corporate representatives to capture data and update a database for basic employee recordkeeping. These same applications also enabled each unit to quickly answer routine questions about their employees and to run local summary reports. The firm's HRIS group then developed computer applications to support less routine HR decisions such as: succession planning; benchmarking jobs for pay decisions; coordinating college recruiters' campus trip schedules and their results company-wide; and estimating pension payout changes in response to employee questions about different retirement dates, contributions, etc. Working together, HRIS and Finance staffs developed an application that enables unit sales managers to estimate the effects of changes in training, sales quotas, headcount, and turnover on their sales revenues and new contracts. The HRIS group also developed an Employee Direct Access system to support the firm's flexible benefits program.

In System Engineering, Profile Two firms have not taken an information engineering approach to HRIS management. They have developed independent databases and applications for discrete HR activities such as compensation, recordkeeping, benefits, and so forth. In some cases, these databases and applications are specific to a particular firm location or employee group. Data quality has sometimes been less than desired. In the late 1980s several trends enabled Profile Two firms to lay the groundwork for an information

engineering approach to HRIS. These include: HRIS support from business unit HR users and line managers; more emphasis on centralization in some areas of their businesses (for example R&D and production), and subsequent demands for integrated HRIS; and the advent of network and client server computer technology that makes the integration and management of large HR databases and multiple applications feasible at lower cost.

Our contingency and information value added framework suggests that the decentralization typical of Profile Two firms places a premium on providing information to HR business unit decision makers. It also implies that any efforts to develop HRIS must garner support and funding from multiple business units. Profile Two HRIS investments in system development have been consistent with these suggestions. Profile Two firms have used a decentralized approach to information coverage. Coverage has been specific to a particular HR activity (such as training) and firm location, and directly supports local user needs at a relatively low cost. Direct support of local needs helped generate enthusiasm for HRIS. This in turn led to demands for HRIS support in other locations. Making databases and applications available to as many locations as possible also fueled business unit enthusiasm. The development of a range of applications that can support many types of HR decisions --from routine ones on employee recordkeeping to more complex ones such as the impact of sales turnover on training costs-- provided graphic, "hands-on" examples of the potential of HRIS to contribute to business unit operations. All these investments laid the foundation for a groundswell of demand for HRIS that culminated in the resource commitments needed to develop more integrated, comprehensive, and widely accessible HRIS.

Profile Two Investments on Organizational Development Dimensions

Profile Two firms have not invested heavily in building bridges among HR, IS, and Payroll organizations and staff skills. This is consistent with Profile Two decentralization and its emphasis on HRIS support for business unit decision makers. Until recently, corporate HRIS groups and central oversight of development efforts were rare in Profile Two firms. Development

reflected independent, "bootstrapping" efforts by interested employees in the business units. Today's corporate HRIS groups in Profile Two firms are typically part of larger corporate departments which also manage compensation and/or benefits for the firm. These HRIS groups are small (five to sixteen) with Information Systems skills often contracted annually or on a project basis. HR trained analysts with some systems background are the most typical HRIS staff. They mediate between IS staff and HR users, answer HR user requests for data, channel development requests through HRIS, and resolve problems with current applications. They are directly involved in the installation of new applications and their documentation, and in related training for HR users. The HRIS analyst position is often seen as a one to two year training ground that generates a pool of "computer-wise" HR talent for placement in the business units. In most Profile Two firms, payroll is controlled by the firm's IS or Finance group.

One Profile Two firm has taken a particularly successful approach to corporate HRIS organization and development. We believe this approach is a model for decentralized firms now beginning HRIS development efforts. Top HR management in this firm perceived a need early-on (late 1970s) for HR systems support in the business units, but thought that no single business unit could muster the resources to effectively develop its own computer systems. Wanting to avoid redundant, poorly designed or purchased applications, the firm appointed a small, corporate group to manage HRIS development for business units. This group has set standards for defining and maintaining HR data, programming applications, and software/hardware compatibility. The results: high quality applications that are easily distributed across business units, and enthusiasm for HRIS among HR users and line managers in these units. This relatively flexible oversight has also provided a solid foundation for the future integration and expansion of HRIS, atypical of decentralized HRIS development.

The HRIS groups in Profile Two firms all emphasize a client and service oriented approach to HRIS. They emphasize the importance of building HR

community motivation concerning HRIS contributions to HR. They have developed informal networks of knowledgeable HR computer users in the business units to keep tabs on user needs and frustrations. HRIS communications are targeted to user needs, and HRIS staff promote or "sell HRIS" to the HR community. These HRIS groups stress that user support and user friendly, practical HRIS applications are the best means of motivating the HR community to use HRIS.

Investments for building HRIS knowledge and training in the HR communities of Profile Two firms were limited to application specific training. Many business unit HR users had some understanding of systems and had developed their own applications. The central HRIS groups kept tabs on these applications and developed the best ones for firm-wide use. Most groups were struggling to nurture these development efforts, yet hold them to the technical standards (data definition, programming protocols, documentation, and so forth) that would enable HRIS to distribute the resulting applications across the firm. For example, one corporate HRIS group offered seed money and resources to developers if their efforts met technical standards.

Finally, HR-Organization technology links in Profile Two firms were externally oriented. HRIS did not maintain formal ties with the other IS and computer groups within the firm, or participate in the ongoing, formal evaluations of new technology typical of Profile One firms. They did, however, build ties with external vendors, professional associations and universities to keep tabs on new technology and its implications for HR.

Summary of Profile Two HRIS Investments and Key Successes

Profile Two firms have developed HRIS with an eye to meeting business unit needs and generating widespread HR community support for HRIS. They report that their investments in applications supporting a range of HR business unit activities, and their emphasis on meeting local data needs have been highly visible and successful in generating both HR and line management support. These decentralized investments represent a relatively low cost means of achieving the early, visible HRIS successes that are needed to muster

business unit funding for more integrated, comprehensive databases and applications.

Building on this HR community support, and in response to increasing business unit and corporate demands for integrated HR information, several Profile Two firms are moving to an information engineering approach to HRIS systems management. They are setting firm-wide standards for HR database development, application programming, and compatible hardware and software purchases. In short, Profile Two firms want to establish more central oversight and direction of HRIS without losing the flexibility and responsiveness of their business unit and client service emphasis.

A FUTURE PROFILE OF HRIS

Firms in Profiles One and Two developed HRIS to support key decision makers and exploit existing strengths in computer technology and in the systems and analytical skills of their work forces. These firms are now shifting HRIS investments to support shifts in strategy, centralization, and the location of key decision makers.

Profile One firms are developing applications to make their HR databases more accessible to all users. For example, one firm is developing an executive information system that allows top managers to type questions in English to get HRIS information. Another is using Computer Assisted Engineering Software (CASE) to help HR managers and IS developers jointly specify the HR application needs. CASE technology allows users and developers to experiment with different application designs before actually programming. It can help users understand the logic of systems and developers, user needs (Laudon and Laudon, 1988).

However, many Profile One firms are devoting a major share of their HRIS investment dollars to motivating and training the HR business unit community. On the motivational front, for example, top management in one firm has championed the importance of HRIS in delivering competitive value to the business, and emphasized that performance evaluations and rewards reflect

involvement in HRIS activities. Line managers are exhorted to support HRIS efforts by their units' HR generalists. This firm has made an all-out 'marketing' effort to promote HRIS -- videos showing top management support, brochures, documentation, orientations and logos targeted to different HR decision makers.

With regard to training, several Profile One firms are developing a range of programs designed to introduce HR employees to basic computer skills, to help them understand HRIS potential to help them in their jobs, and to develop skills for specific HRIS applications. One firm has built a training program around an application used to help managers allocate and track the merit increases they provide employees over an annual budget cycle. The program covers the analytical reasoning that led to this application's development, and demonstrates how this reasoning might be applied to other HR issues of interest to business units. In another firm, the corporate HRIS organization is training selected HR business unit people to handle simple end user development requests --changing user screens, adding selected data, and dealing with basic problems involving hardware, software, and existing HR applications. In both cases the aim is to enable HR business unit people to better utilize HRIS.

In contrast, Profile Two firms are devoting more of their HRIS investment dollars to integrate and expand their HRIS databases and applications. Most have set up task forces to outline a firm-wide view of HR information needs. They are setting firm-wide standards for defining data, programming applications, and for compatible hardware and software purchases or developments. One firm plans to invest in client server rather than mainframe technology as a more cost effective means of integrating and expanding HRIS. The HRIS group is formally linked with other technology users throughout the firm to support this move.

These examples illustrate the shifting patterns of HRIS investments in the ten firms we interviewed. Figure 7 depicts one future profile of successful HRIS investments. We propose that continuing, substantial

investments in HR community motivation and training will enable firms to better use HRIS to support a full range of HR decision making. Moreover, as the HR community begins to better appreciate HRIS, they will become more involved in systems development decisions concerning what HR information the firm needs and who should have access to it. This participation will result in a winnowing of the information in HR databases, improving both its quality and relevance. Participation may also expand the firm's definition of who should have access to what HR information, thus expanding the range of decision making HRIS can support. For example, HR decisions on salary increases, promotions, and so forth could be handled directly by line managers. Or more joint decision making with marketing, finance, purchasing, would be feasible. All such developments could add value to the firm.

The specific HRIS investments, and the order in which they are made will depend on firm contingencies. For example, given their lower investments in mainframe technology, Profile Two firms may invest much more heavily than Profile One firms in emerging client server technology. We can speculate that the need to work with this technology will influence the kinds of training programs developed for the HR community, the types of applications developed and the decisions they support, and the nature of HR-IS links. Given the contingency perspective, the definition of a profile of future investments in HRIS is inevitably a moving target.

USING FINDINGS TO IMPROVE HRIS INVESTMENTS AND RESEARCH

The profiles we have described suggest that HRIS investments can add value to a firm, and that value-added investments will vary with organization contingencies. HRIS investments in Profile One firms produced administrative efficiencies and broad-based support for corporate level policy decisions. Investments in Profile Two firms supported business level HR decisions and motivated the HR community to propose new ways to use computers in HR management. While both profiles gained from HRIS investments, the firms represented in each profile differed in environment, structure, centralization

and identification of key decision makers, HR work force skills, and the timing and nature of their initial HRIS investments. Our findings suggest that in making HRIS investment decisions HR managers should: (1) identify the key decisions makers in the firm and develop HRIS to support them; (2) consider each of the nine dimensions of successful HRIS development observed in our interviews; and (3) assess organization contingencies that will influence the cost of successful HRIS development and implementation, and thus the potential value-added of HRIS investments. Our findings also suggest that developments in computer technology and changes in a firm's strategy, structure, centralization, and work force skills are associated with shifts in the pattern of HRIS investments that add the most value. The future profile of HRIS will continue to change.

The dimensions of HRIS development and the patterns of investments we observed provide a "strawman" against which additional case studies can tally similarities and differences. For example, our ten interviews focused on large organizations with well-developed HRIS. It would be interesting to know if the same patterns of HRIS investments occur in smaller organizations, organizations just beginning to automate their HR function, or public-sector organizations. Our interviews focused on domestic HRIS; investments and development dimensions may differ for global HRIS. We conducted interviews with the corporate HRIS group. This perspective is useful, but line managers, top (non HR) executives, business unit HR staff, and others might have different views about the dimensions most important to consider in HRIS development, and the value added HRIS can offer the firm. The HRIS dimensions we observed could also be used to generate more specific survey questions. A survey questionnaire could then be used to systematically sample many of the different perspectives and levels of analysis just listed.

Interviews and surveys of HRIS staff to record their impressions of HRIS value-added are useful, but they do not identify the actual effects of HRIS on the organization. Our interviews uncovered a lack of systematic evaluation of HRIS investments and their effects. What are the effects of such initiatives

as Employee Direct Access applications, more complex expert and decision support systems, and more comprehensive HR information coverage on the performance, behaviors, and attitudes of the HR community, and other employees and managers? What are the effects on unit or firm level measures of performance? Do traditional measures of performance need to be expanded in assessing HRIS? Are there particularly promising models of HR applications, of processes used to develop HR applications, and so forth that could be promoted throughout the firm? There is virtually no field research that helps us identify specific costs and benefits of HR computer systems, yet this is precisely the kind of information managers need to make more value-added HRIS investments.

Finally, our interviews indicated that all ten firms had made many HRIS changes the late 1980s, and were contemplating many more. How, for example, might HRIS benefit from client server technology, advances in information storage and processing, new capabilities for imaging and sound transmission, and so forth? A gathering of experts --in computer systems development and HR-- to speculate about the future of HRIS and its potential contributions to business might be useful to long range planning.

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SYSTEM DEVELOPMENT DIMENSIONS:

System Information Coverage
System Availability
System Decision Support
System Engineering

ORGANIZATIONAL DEVELOPMENT DIMENSIONS:

Building HR-IS Bridges
Building HR-Payroll Bridges
Building HR Community Motivation
Building HR Community Knowledge
Linking HR-Organization Technology Strategies

FIGURE 1 NINE DIMENSIONS OF SUCCESSFUL HRIS DEVELOPMENT

Information Coverage Categories

Employee Status	Locations	HR Functions	History
Applicants	U.S. Parent -cost ctr. -profit ctr.	Employee records Pension Group Benefits Compensation	#Yrs saved #Yrs online
Active/Inactive		Accident/Safety EEO	Date sensitivity
Hourly/Salaried	U.S. Subsidiary -cost ctr. -profit ctr.	Job Inventory Job Performance	
Retirees		Career Development College Programs Recruitment Selection Training	
Terminees	Non U.S. Affiliate -sales -other	Illness/Absenteeism Labor Market Wages Labor Relations	
Benefits Dependents			
Benefit Survivors			
Contractors			
Multiple statuses			

FIGURE 2 HRIS SYSTEM DEVELOPMENT DIMENSIONS: SYSTEM INFORMATION COVERAGE

Availability Categories

Employee Level	Geographic Locations	Types of Use Authorized
HR Administrative Staff	U.S. Parent	Data Query, Capture and updating/editing
HR Professionals	U.S. Subsidiaries	Reporting
HR Managers	Non U.S. Affiliates	File downloading
Non HR Professionals and Managers	Supply Sources	Modeling/analysis
Executives	Contractors	Can send data within firm
Individual Employees	Plan Administrators	Can send data outside firm
	Insurance Carriers	
	Sales Distributors	

FIGURE 3 HRIS SYSTEM DEVELOPMENT DIMENSIONS: SYSTEM AVAILABILITY

Transaction Processing: High-volume data processing for sorts, lists, merges, edits and updates of data. Allows simple calculation of percentages, sums or averages. Makes reporting, processing and calculating quick and efficient.

HR Examples: On-line reporting of merit pay guidelines, payroll and benefits processing for recordkeeping for OSHA, EEO or other governmental reports.

Value Added: Reduction in time, people, paper necessary to accomplish routine tasks. Increase in accuracy and timeliness of reported information.

Office Automation: Provides extensive, networked access to standard office documents, files, and schedules. Often tied to electronic mail and word processing software; can include simple spreadsheet and data base management software. Can tie information from transaction processing applications to simple on-line reports.

HR Examples: Online HR policy manuals, job descriptions, and benefits guideline manuals.

Value Added: Reduction in time, people, and paper necessary to accomplish routine communication. More accurate, timely information which can enhance many routine decisions.

Tracking Deviations From Goals, Modeling and Forecasting: Lower volume data processing applications that track current deviations from annual performance goals such as head count, budgets or sales, or that predict future goal attainment or performance using historical or estimated data. Tracking applications record deviations; modeling and forecasting applications help diagnose reasons for failure to reach goals and suggest recommend alternatives. Statistical analysis and graphics capability are often included in these applications to help communicate the results.

HR Examples: Tracking current over and under-spent merit pay budgets; Forecasting the effects of work force demographics on future compensation and benefit obligations.

Value Added: Tracking applications enable adjustments to current practice more quickly than manual systems would. Modeling and forecasting applications can improve decisions via better description of future trends. The value of the latter is affected by the importance of the decisions supported and the skills of those using them; they can drastically improve strategic policy decisions that can affect the entire work force.

Decision Support Systems: Very low-volume data processing that takes models previously used by skilled analysts and creates computer systems that capture the analyses for executives or other decision makers. These systems guide decision makers through the analysis, so that even less skilled computer users can benefit from a variety of analytical tools. Sophisticated versions may include natural language, expert systems, and interactive modeling capabilities. Sophisticated executive support systems would fall in this category.

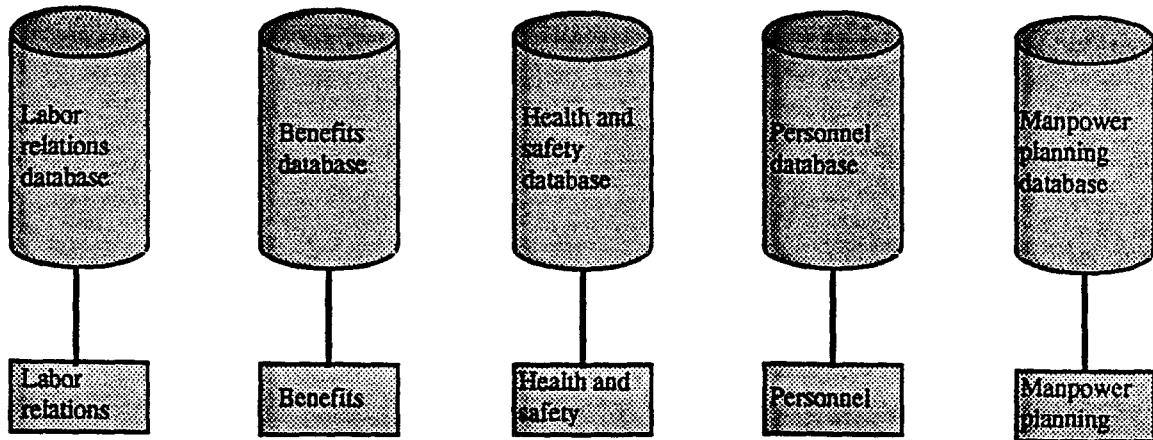
HR Examples: Managerial data system that presents current compensation budget or head count trends, notes deviations from goals, and projects future deviations. Application linking HR outcomes such as training time, turnover, hiring levels, and productivity to bottom-line outcomes such as costs, revenue and profits.

Value Added: Better-quality strategic decisions. These systems may improve decisions that are infrequent, but critical to organizational competitiveness. Value lies less in cost reduction than in better decision results.

:

FIGURE 4 HRIS DEVELOPMENT DIMENSIONS: SYSTEM DECISION SUPPORT

Information Processing Focus:



Information Engineering Focus:

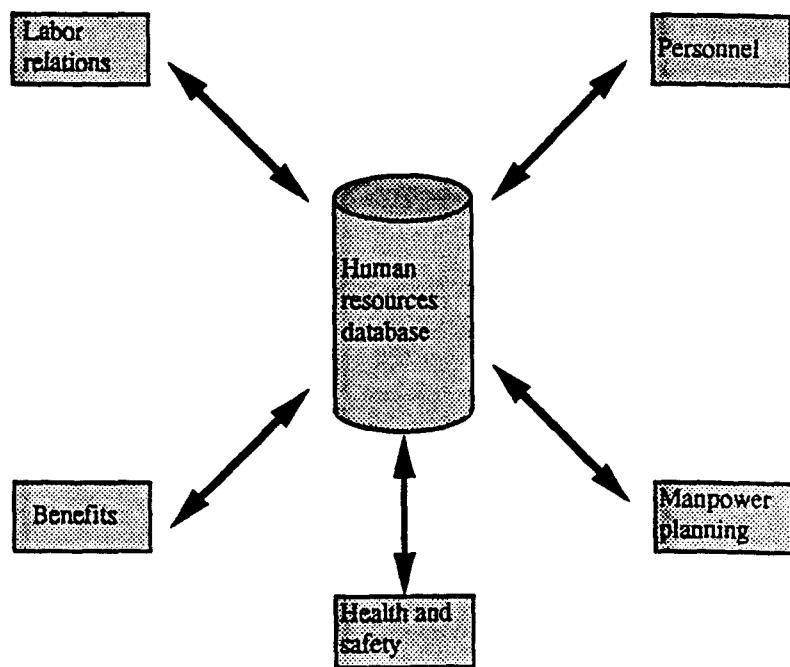
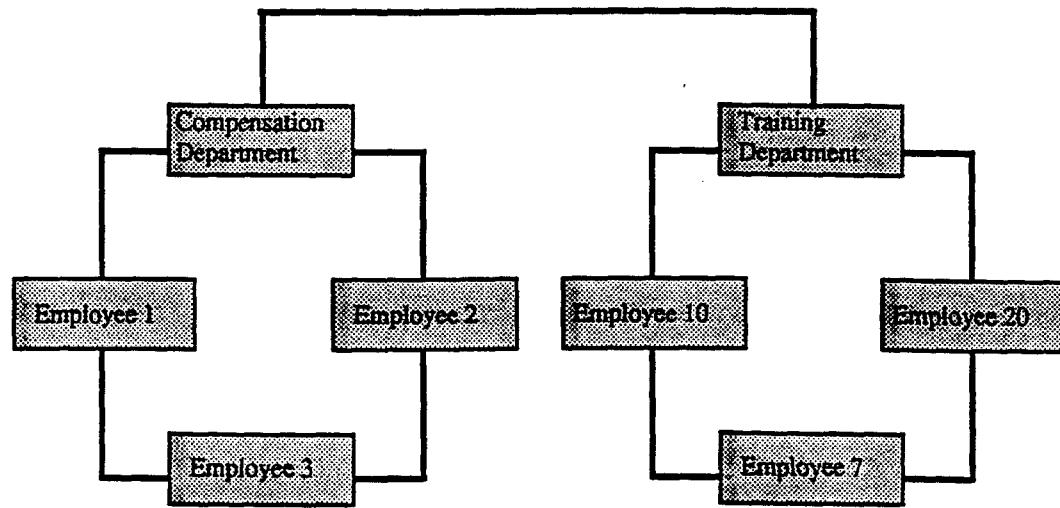


Figure 5A: Differences in HR Systems Management

A network design:



A relational design:

Table or file	Data element				
Location file	Employee name	Unit Address	Unit ID	Location ID	Employee ID
Job file	Job ID	Employee ID	Job Title	Time in Job	
Service file	Status Code	Employee ID	Hire Date	Service Date	
Base Pay file	Employee ID	Grade	Base Pay	Increase	

Figure 5B: Differences in Integrated Design

	Profile One	Profile Two
	<u>Centralized Mainframe</u>	<u>Decentralized, PC Based</u>
<u>System Development Dimensions</u>		
1. Database(s) Coverage	Comprehensive	Application Specific
2. Availability	Extensive to HR and other users	Extensive to HR and other users
3. Decision Support	Supports routine, administrative decisions; focus on corporate	Supports range of HR decisions from simple administrative to more complex decisions; focus on business units
4. Engineering	Focus on information as a corporate resource	Focus on data processing for specific applications
<u>Organizational Development Dimensions</u>		
5. HR-IS Bridges	Large HRIS staff, managed by HR; High % IS skills to support mainframe tech; strong HR-IS links	Small HRIS staff, managed by HR, HR skills dominate; weak HR-IS links
6. HR-Payroll Bridges	Payroll/HRIS integrated or closely interfaced; strong HR-Payroll links	Payroll-HRIS independent weak HR-Payroll links
7. HR Motivation	Little investment	High investments
8. HR Knowledge	Little investment	Little investment
9. HR-Organization Technology Links	Strong internal links; formal evaluation of technology potential	Weak internal links; external networks to keep tabs on technology development

FIGURE 6 TWO PROFILES OF HRIS INVESTMENTS

System Development Dimensions

- | | |
|----------------------|---|
| 1. Database Coverage | High quality HR information reflects firm's decisions needs |
| 2. Availability | Extensive --available to all HR and many non HR users; fewer security and ownership issues |
| 3. Decision Support | Broad range of application support for decisions within HR and joint decisions with other business areas |
| 4. Engineering | HR information viewed as a corporate resource; relational database designs to make user access easier; HR databases viewed as competitive resources |

Organizational Development Dimensions

- | | |
|---------------------------------------|---|
| 5. HR-IS Bridges | Boundaries between skills in each area diminished; HR people understand information management and IS people understand how to support HR |
| 6. HR-Payroll Bridges | Integration under HR probable |
| 7. HR Community Motivation | Substantial, continuing investments |
| 8. HR Community Knowledge | Substantial, continuing investments |
| 9. HR-Organization Technology Bridges | More extensive interaction among all firm technology users; more firm-wide standards for technology to support cooperative information management |

FIGURE 7: FUTURE PROFILE OF SUCCESSFUL HRIS INVESTMENTS