

**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?

- o Which key decision makers in the organization could benefit most from HRIS decision support?
- o 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)?
- o For which HR tasks can computer systems achieve the greatest cost reduction; are these tasks critical to organizational goals?
- o 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; Govindaranjan; 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

