The Impact of e-HR on the Human Resource Management Function

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I. *Introduction*

The Human Resources (HR) function has always been on the forefront of integrating technology in organizations. In fact, one of the earliest business processes to be automated in organizations was payroll administration. Since then, HR has continued to merge new technology with old processes. For example, most organizations use computers to maintain their employee records. These human resource information systems (HRIS) increase administrative efficiency and produce reports that have the potential to improve decision making.

Today, managers and employees are assuming activities that once were considered the domain of human resource professionals and administrative personnel. This represents a significant break with the past, but one that has the potential to improve overall organizational effectiveness. Both managers and employees can respond more quickly to changes when they have relevant information that is accessible — and when they are empowered to make decisions using that information. HR has made this happen. But, what does this mean for the future of HR?

What is e-HR? Recent developments in technology have made it possible to create a real-time, information-based, self-service, interactive work environment — something that was not possible throughout most of the twentieth century. The term "e-HR" was first used in the 1990s when "e-commerce" (or electronic commerce) was sweeping the business world. Like e-commerce, e-HR referred to conducting business transactions — in this case human resources — using the Internet. The Internet initially provided human resources departments with the opportunity to make information available to managers and employees any time they needed it and anywhere they wanted it — as long as they had access to a connected computer. However, over time, human resource professionals began to explore the full range of possibilities for using the Internet along with other technologies for the delivery of human resource services. Today, a total e-HR system may include enterprise resource planning software (ERP), HR service centers, interactive voice response (IVR), web applications, voice recognition systems (VRS), and manager and employee portals.

With e-HR, managers can access relevant information and data, conduct analyses, make decisions, and communicate with others — and they can do this without consulting an HR professional unless they choose to do so. For example, a manager who wants to make a merit pay decision may access files containing text, audio, and video describing how best to make the decision. Then, the manager can access the data file containing information on his/her employees. With a click of the mouse, the decision is recorded and other departments (such as finance) are notified. Hours of processing are reduced to minutes, and much paperwork is avoided by the use of this technology.

With e-HR, employees control their own personal information. They can update records when their situations change and make many decisions on their own, consulting human resource professionals only when they deem it necessary. For example, an employee who wishes to increase investments in a retirement plan can do so from work or home using the Internet. Employees may also, for example, participate in a training program at home after working hours.

For the human resources function, e-HR has the potential to affect both efficiency and effectiveness. Efficiency can be affected by reducing cycle times for processing paperwork, increasing data accuracy, and reducing human resource staff. Effectiveness can be affected by improving the capabilities of both managers and employees to make better, more timely decisions. e-HR also provides the HR function the opportunity to create new avenues for contributing to organizational effectiveness through such means as knowledge management and the creation of intellectual and social capital.

So, what is the impact of e-HR on the human resources function of the future? First, it will be smaller than it has been in the past. Organizations will no longer need scores of clerks to record information and process forms. Second, it will have a more strategic/managerial role rather than an administrative one. Time previously spent on administrative issues will be replaced with time spent on firms' competitiveness issues. And, third, the human resources function will be able to create new paths to add value to the organization. The HR function can move beyond its traditional focus of hiring, training, compensating, etc. to assume new roles such as human capital steward, relationship builder, and knowledge facilitator (Lengnick-Hall and Lengnick-Hall, in press).

Dell, the world's leading direct computer systems company, has been applying Dell's Direct Model to its own human resource services delivery since about 1996. Starting with web-based employee self-service for benefits enrollment and evolving to on-line pay planning and performance management, Dell ultimately implemented a full suite of HR services, all managed through self-service over the web (e-HR). Herein, we (1) define e-HR, (2) provide an overview of the history of e-HR and the forms it may take, (3) explain why many organizations are using e-HR, (4) describe the experience of several organizations that have adopted e-HR, and (5) predict how e-HR will continue to evolve in the future and its likely impact on the human resources function. We conclude with suggestions for research.

II. *The History of e-HR*

e-HR emerged from the confluence of several important changes in society and business. First, the nearly universal availability of personal computers was necessary to

provide managers and employees with the hardware needed to conduct human resource transactions on-line. Personal computers provided an important part of the infrastructure on which e-HR could be built. Second, widespread computer literacy was necessary for employees and managers to take advantage of the opportunities that advances in technology offered. It is not enough to have the requisite technology. People must know how to use it. Third, the Internet provided the means for linking personal computers and computer literate employees and managers in real-time. Connecting people and data removed many of the physical barriers that previously hindered interactions and slowed business processes. Fourth, enterprise resource planning software and its various derivatives made it possible to link all of a business' operations together. ERP provided the model — and sometimes the software — for linking often disparate databases into a seamless whole for real-time transaction processing and decision making. Fifth, human resource professionals along with information technology specialists created software and systems that moved HR information and decision making from file drawers to computers. By asking questions such as "how could we use a computer to do this faster, cheaper, and better?" processes were reengineered to eliminate steps and speed up cycle times.

e-HR has developed through three major forms. The simplest and easiest to implement is publishing information. More involved forms of e-HR include automating transactions. Finally, the most complex forms of e-HR transform the way HR is conducted in the organization.

The first form of e-HR is simply publishing *information*. This involves one-way communication from the company to employees or managers. This form of e-HR typically uses intranets as the primary information delivery medium. Earliest information publishing efforts involved generic content (e.g., company policies and procedures; benefits; directories of services; current events, etc.). This was often followed by the introduction of personalized content (e.g., job openings tailored to individuals).

Simply publishing information on the web provides several benefits to organizations. Expensive printing costs can be virtually eliminated. Changes in published information can be made immediately and users can be quickly and easily notified of those changes. Users (managers and employees) can get current, relevant information whenever they need it and from wherever they have access to computers with linkages to the Internet. Of course, issues of web design, information quantity and quality, and information control could limit the utilities of these efforts, but the best designed and best implemented systems yield noticeable benefits.

The second, higher-level form of e-HR involves the *automation* of transactions, workflow, and even supply-chain integration. This form of e-HR typically uses intranets along with extranets, and frequently combines several different application programs. In this form of e-HR, paperwork is replaced by electronic input. Managers and employees can access databases, update information, search for needed information, and make decisions. For example, employees can access a back-end database that provides employee-specific data for inquiries such as: paid time-off accruals and balances, current benefit coverage, personal demographic data, work schedules, and retirement plan balances (McCormick, 2002). Procedures that required much time, paperwork pass-

ing among staff, and multiple approvals, can now be accomplished by end users without face-to-face administrative support. Workflow applications enable users to complete an entire process (e.g., obtain a salary increase for an employee), with built-in checks to assure compliance with organizational policies. Furthermore, functional processes (e.g., finance, accounting, purchasing, etc.) which may maintain separate databases and applications are integrated into seamless, user-friendly presentations for end users. The highest level of automation occurs with supply-chain integration, which allows organizations to coordinate human resource processes (e.g., assuring quality by using similar performance appraisal processes) among suppliers and distributors, improving efficiency and effectiveness along the entire value chain.

The third, and highest-level form of e-HR involves *transformation* of the human resources function. From information to automation to transformation, e-HR begins to move beyond its more traditional focus. In the transformation form, e-HR liberates the human resources function from its operational focus and redirects it toward a strategic one. Walker (2001) identifies three types of work for human resources in this transformation form: *strategic partnering* with the line businesses (at a leadership and senior level; at the local, generalist level); creating *centers of expertise* (housing the required human resource functional specialists); and *service center administration.* Getting nonstrategic tasks done faster, cheaper, and with less reliance on HR staff creates the opportunity to focus on new ways to add value to the organization. HR can play a more active role in the stewardship of the organization's "intellectual capital" (the know-how, skills, and capabilities of individuals in an organization), developing the organization's "social capital" (the connections between people that leverage productivity and innovation) and facilitating the flow of knowledge ("knowledge management") in order to create new products and services, improve efficiencies in serving customers, and develop capabilities that lead to new sources of value creation. To date, few companies have achieved the transformation form of e-HR, but the possibilities are encouraging.

In conclusion, e-HR can be characterized by three forms: information, automation, and transformation. What form an organization adopts is likely influenced by such factors as the availability and accessibility of personal computers with broadband connections, the proportion of an organization's employees who are computer- and Internet-literate, and the number of human resource professionals and information technology specialists with the expertise to design and implement custom-fitted solutions for their organizations. While some organizations may take an evolutionary approach to implementing e-HR (moving from publishing information to automating transactions to transformation), others may opt for a more quantum change and move directly to transforming the HR function. Since e-HR is both time-consuming and expensive for most organizations, the first step is to convince decision makers that the benefits are greater than the costs.

III. *The Benefits vs. the Costs of e-HR*

Why would an organization undertake the implementation of an e-HR system? An e-HR system can represent a large investment decision for companies of all sizes. Therefore, a convincing case must be made to persuade decision makers that the ben-

efits outweigh the costs. A typical argument is: Use e-HR and your organization can reduce process and administrative costs. Fewer human resource professionals are needed because e-HR eliminates the "HR middleman." Furthermore, e-HR speeds up transaction processing, reduces information errors, and improves the tracking and control of human resource actions. Thus, e-HR improves service delivery.

Most organizations that adopt e-HR rely on available, accessible, and tangible measures to make a business case for the investment. Some metrics that are used to justify e-HR include: the average cost of an HR transaction, number of inquiries to the service center, cycle times, headcount changes, employee satisfaction, and financial metrics, such as the return on investment or payback period (Anonymous, April, 2002). In their 2002 e-HR survey, Watson Wyatt found that the top four metrics used in formal business cases supporting e-HR were: productivity improvements within the HR organization, cost reductions, return on investment, and enhanced employee communications.

Many of these cost reductions and efficiency gains are likely to be realized early in the implementation of an e-HR system, so they provide compelling evidence when it is needed to get a project up and running. In fact, the payback period, or the time it takes to recoup the investment, can be as short as one to three years (Lego, 2001). However, while it may be possible to identify many of the relevant costs (e.g., software and hardware), it is more difficult to quantify the intangible benefits to be derived from an e-HR system.

Beyond cost reductions and productivity improvements, e-HR also has the potential to fundamentally affect revenue channels. However, establishing direct and objective measures of these benefits is more difficult to achieve. For example, e-HR may improve employee productivity, employee morale, decision making, and information sharing; it may enhance innovation; and it may speed up the time-to-market for products. In addition, e-HR can fundamentally change the way individuals relate to one another and to their organizations through various communication media. This may improve the flow of information and expertise throughout the organization enhancing firms' strategic capabilities. While a logical case can be made that these consequences of e-HR affect an organization's "bottom line," an empirical case is more challenging to develop.

On the other hand, there are costs associated with implementing an e-HR system. For example, "wiring the work force," (ensuring that everyone has access to the e-HR system), requires providing personal computers and Internet connections for all employees. Moreover, to capitalize on all of the possibilities of e-HR, workers need to have personal computers and Internet connections at home as well as at work (including work "on the road"). Some companies facilitate this outcome by providing employees computer discount programs to encourage home usage. In addition to "wiring the work force," there are inevitably transition costs associated with moving from a more "traditional" HR to an e-HR system, including slowdowns, mistakes, and other consequences of changing from old to new — from legacy systems to integrated suites. Hardware costs for servers and software costs for application programs entail sizeable initial outlays and continuing costs over time as better technology becomes available.

While many companies are adopting e-HR systems and extolling their benefits, others are taking a "wait and see" attitude before embarking on such an expensive and time-consuming change. Some firms are "testing the waters," by adopting less complex forms such as "publishing information," before attempting to transform their HR departments. And for those who have already adopted e-HR, many have yet to realize its full benefits. For example, a recent survey by Towers Perrin found that 80 percent of respondents said employee self-service can lower HR costs, but only 5 percent said they fully achieved this objective, another 35 percent said they have only partially achieved that objective, and only 3 percent said it was accelerating HR's transformation to a strategic partner (Brown, 2002). This is why learning from the experiences of pioneering companies in the world of e-HR can be so valuable. Next we describe some company experiences with using e-HR.

IV. *Companies That Have Implemented e-HR*

It is hard to accurately capture the extent of e-HR usage by organizations. Survey data on e-HR practices are scattered and nonscientific. Most reported surveys (e.g, Anonymous, 2002), rely on convenience samples. Consequently, little is known about the extent of e-HR dissemination across organizations.

What little we do know about e-HR practices can be discerned from anecdotal evidence offered by some of the pioneering companies that have reported their experiences. Three companies that have adopted some form of e-HR are described next to illustrate the commonalities and differences in their efforts: American Family Insurance; Avaya, Inc.; and Dell Computer Corporation.

American Family Insurance. The catalyst for change at American Family Insurance came from new president and Chief Operating Officer Dave Anderson (McDonald, 2002). He challenged all functions in the organization — including HR — to examine how they could better leverage technology, be more innovative in their business processes, and partner with other functions. Rather than building their e-HR system on top of legacy computer systems, American Family's HR department was able to piggyback on top of the new corporate enterprise solutions. At the urging of the top HR executive, the HR staff was given the mandate — called "ruthless execution" — to aggressively implement the new approach to handling HR transactions in the organization. The initiative was announced in September, 1999 with a goal of implementing the entire system by 2002.

Customer surveys and focus groups helped the HR staff at American Family create a system for the benefit of users and not simply for the convenience of the HR department. What resulted was an e-HR system called "No Barriers (No Kidding)" the goal of which was to give every employee technological tools needed to conduct basic HR transactions using the web. It was hoped that by moving routine questions and tasks to the web, HR staff could be freed to concentrate on more strategic consulting roles. The company achieved a 20 percent return on investment and reduced its operating budget by 10 percent in the first year. It also reported that acceptance by service users and the internal HR staff has been overwhelmingly positive.

American Family Insurance reconfigured its existing HR department, opening up all HR jobs to employees at all levels. Seven HR offices were closed, but all affected HR employees were allowed to apply for jobs in the newly transformed HR department. By Spring of 2000, the new organization structure was in place, and the HR department looked quite different from what it was before. One significant new job was titled "business partner," and had as responsibilities working directly with line directors and top management of each division on a wide range of strategic people issues.

American Family insurance chose to use e-HR to transform their HR function, and the mandate of the company president legitimized the effort. Their top HR executive was an enthusiastic advocate of the new system. In addition, the company sought to make a quantum, rather than piecemeal change. And finally, American Family moved quickly to adopt e-HR, rather than accept a slower, more evolutionary approach. Reported results indicate that American Family Insurance has reaped the benefits. American Family Insurance provides an example of one way a company can move from "traditional" HR to e-HR.

Avaya, Inc. Avaya, Inc. is a business communications and enterprise network company that was spun off from Lucent technologies (Waltke, 2002). The catalyst for changing HR at Avaya was the forthcoming deadline when it would no longer be part of Lucent and would have to survive on its own. Timing provided both a threat and an opportunity for change. There was little time to implement a complex e-HR system; yet it was the perfect time to make such a major change in the way HR could be managed in the newly formed business.

Avaya chose to push three primary initiatives: (1) establish global employee services and global employee service centers, (2) implement software vendor SAP's HR system and BrassRing for on-line recruiting, and (3) outsource where it was strategically and economically justified. Because of their goals and time constraints, the company decided to use "plain vanilla" installations, configure — but not customize — the SAP system, help managers conduct their own HR through the use of self-service, and provide employees more access and control of their own data through self-service. In addition, Avaya outsourced services that were not part of the company's core competencies and used 30 different vendors for services ranging from payroll to expatriate administration.

The new HR department at Avaya consists of "*centers of excellence*" (providing HR expertise in such areas as work force relations, compensation, and recruiting), *HR service centers* (responding to employee administrative inquiries and processing HR transactions that are not handled by employee self-service), and *shared services* (managers assume new roles in delivering HR services, and employees assume new responsibility for their own personal data and career issues). This design for the HR department is similar to what Walker (2001) describes as the model structure for an organization that has adopted a transformational form of e-HR.

Avaya represents an alternative approach to e-HR and its implementation in comparison to American Family Insurance. Here, a corporate unit that has been divested is much like a new "startup" company, with the opportunity to build its e-HR system

from "scratch." By combining web-based self-service, centers of excellence, and HR service centers, along with aggressive outsourcing of many HR services, they have created a transformed HR function at the outset that is consistent with the new venture's corporate strategy.

Dell Computer Corporation. The catalyst for change at Dell was the company's unrelenting cost-reduction strategy, a strategy that has enabled them to survive even the industry's most recent severe downturns. In the mid-1990s, the company determined that its HR staff and budget was growing much larger than could be justified to accommodate the rapidly increasing employee population. Consequently, the HR department looked to e-HR to reduce HR staff, increase service to customers, and change the roles of HR professionals from administrators to strategic partners and consultants.

Rather than purchasing an enterprise resource planning (ERP) software, Dell chose to build its e-HR system by purchasing "best of breed" applications. That is, they began by setting criteria for what they wanted the system to do, and then found the appropriate application components. Considerable attention was paid to the design phase: principles such as "no training required," and information should be "no more than two clicks away from the start page" helped them create a system that fit the unique needs of Dell and its culture.

Called "HR Direct!," Dell's e-HR system's goal is to drive direct ownership and management of information back to managers and employees. In the same way that Dell does not use intermediaries to sell computers to customers, HR Direct! does not use HR intermediaries for the majority of HR processes. Dell's HR information strategy is "to provide a global information system environment where HR information is readily accessible to our customers, and leads them to direct ownership of their information, ensuring its accuracy, timeliness, and relevance."

Dell began implementing components of an e-HR system in 1996. From late 1996 to 1999, the implementation approach could best be described as incremental and piecemeal. Modules such as "my organization," pay planning, stock-purchase-plan administration, external job postings, corporate directory, recruiter résumé builder, stock-option nominations, and others were developed and implemented throughout this period when they became available. Then, in March, 1999, Dell began a two-phase, holistic approach to implementing the new "HR Direct!" system. HR Direct! became Dell's HR system of record in 2000. Since then, staffing processes have been integrated and the system now is being deployed globally.

Dell estimates costs savings of $2.5 million the first year. There was a substantial decrease in turnaround time for HR transactions — from 10 days prior to HR Direct! — to 1.0615 days after HR Direct! Furthermore, HR can now better control costs associated with managerial negligence. For example, it is now possible to pinpoint which managers are processing terminations retroactively, how many, and how late, and do something to correct it. This action produces dollar savings via reduced overpayments to terminated employees, and gives HR the tools to be more "consultative" with line managers.

Information flow has improved dramatically. Employees and managers have increased requests for information, but no increase in HR staff or additional resources has been required. In addition, Dell employees and managers now get answers to questions they would not have even bothered to ask prior to the implementation of the HR Direct! system. Furthermore, employees now have confidence that their personal information is correct: They can check it and ensure its correctness themselves. Finally, early indications suggest that employees have positive reactions to the system.

Dell's HR department also has been transformed. There are fewer HR staff. HR professionals now serve in more consultative and strategic, rather than administrative, roles. Dell also uses a "centers of competency" approach, in which HR expertise in specific areas, such as compensation and staffing, is housed. Additionally, they maintain an HR Service Center (to handle questions that cannot be resolved through self-service), although this function has been greatly reduced in size with the advent of HR Direct!

As with American Family Insurance Company and Avaya, Inc., Dell has found that e-HR has freed the HR function from the administrative burdens of the past and enabled it to look for new ways to add value to the organization's "bottom line." Dell has, however, taken a different path to e-HR than either American Family Insurance or Avaya, Inc. Dell has designed its e-HR system by combining different applications and technologies, rather than a single, integrated suite. Furthermore, Dell began moving toward e-HR through incremental additions of process applications. However, once Dell decided to transform the HR function, a more quantum and rapid approach to the change was adopted. Dell has also transformed its corporate culture with its "direct ownership" approach to information management — empowering managers and employees to control their own information.

V. *The Future of e-HR*

What's next for e-HR? Technologically, there will be enhancements to the web portals — they will become more sophisticated and more individualized workplace productivity tools for managers and employees. Improved decision-support tools, such as those currently being tested for health insurance, will benefit both organizations and employees. And, virtual workplaces will become more commonplace and heavily used. The human resources function will be liberated from administrative shackles and able to focus more on developing intellectual capital, social capital, and managing knowledge to improve an organization's competitive advantage. Consequently, the human resources function of the 21st century will be substantially different from that of the previous century.

Web portals that give employees access to information will continue to evolve. For example, Dell has created a visionary prototype for the next level of web portal called the "personalized corporate portal." Different people need different information; one size does not fit all. Therefore, this prototype consists of a personal start page ("My Intranet"), which is a dynamically generated home page that would combine: (1) what

the company knows an individual employee needs to be successful, and (2) what an individual employee knows he/she needs to be successful. This dynamically generated home page operates similarly to how Amazon.com tailors specific information to its customers when they log on to the company's website.

Decision-support tools will become more numerous and more sophisticated, improving decision making by managers and employees in organizations (Boyett and Boyett, 2001). These tools will provide managers step-by-step information about human resource issues. For example, what information managers receive will depend on how they respond at each step. In addition, managers will be provided with risk assessments for each of the alternatives they consider. These decision-support tools will also provide "predictor" algorithms that aid managers in anticipating and forecasting potential problems, such as turnover, recruitment, compensation, and labor relations. Sensitivity analyses (or "what if" analyses) will allow managers to try out different alternatives and assess the potential consequences of their decisions.

Decision-support tools will also provide employees step-by-step information about human resource issues. For example, Humana is currently testing a health insurance system on its own employees that will soon be offered to the company's many customers. Employees enroll in the health plan, called SmartSuite, and an on-line "wizard" asks them questions and helps them choose the most appropriate of six options that meet their needs (Hathcock, 2002; O'Keefe, 2002). In the Summer of 2002, Humana tested a version of its system that offers employees 42 different plans. It presents employees with trade-offs, such as pay less in monthly salary deduction by agreeing to a larger deductible and bigger prescription co-pays. Humana's preliminary results show that employees are accepting more risk in exchange for lower monthly payments, which helps control health insurance costs. Both the decision support and the degree of individualized health care options would not be possible without web-based technology. Decision-support tools are key to educating employees about the true cost of health care, providing them with the information necessary to make complex benefit decisions, and generating preference data that HR can use to drive strategy.

Virtual workplaces will become more commonplace in the future. Employees will use on-line meetings, project-team workspaces, web conferences, and video conferencing. Virtual workplaces provide several advantages to organizations (Cascio, 1998): (a) they save time, travel expenses, and eliminate the lack of access to experts; (b) they can be organized whether or not members are in reasonable proximity to each other; (c) firms can use outside consultants without incurring expenses for travel, lodging, and downtime; (d) they allow firms to expand their potential labor markets, enabling them to hire and retain the best people regardless of their physical location; (e) employees can accommodate both personal and professional lives; (f) dynamic team membership allows people to move easily from one project to another; (g) employees can be assigned to multiple, concurrent teams; and (h) team communications and work reports are available on-line to facilitate swift responses to the demands of a global market. e-HR will become the "connecting tissue" that brings together disparate technologies to enhance employee productivity — likely through the web portals described

previously. HR will help design the technology to realize the potential of virtual workspaces; HR will also design the policy and facilitating infrastructure to support and manage these new innovations.

The human resources function will monitor employee opinions and attitudes in real time rather than periodically, as was frequently done in the past (Boyett and Boyett, 2001). e-HR will make "pulse surveys" possible and discover what employees think about various issues, or determine employee preferences for alternative HR services — and this can be done instantaneously. Organizations can use electronic chat rooms and "open door" e-mail to get an early warning of employee concerns, problems, and grievances before they escalate into serious crises. As a result, HR will be able to constantly monitor people issues and make adjustments in a timely fashion to either take advantage of opportunities or to preempt threats.

The human resources function will still be responsible for traditional activities (e.g., recruiting, selection, training, and compensation), but its responsibility will shift from hands-on, face-to-face, service delivery to system design and maintenance functions. Consequently, HR professionals will need more information technology knowledge and skills than they have had in the past. In addition, HR must acquire or build a policy and systems infrastructure that can support an organization's need for rapid response, global integration, and total flexibility. e-HR will make it possible to get nonstrategic tasks done faster and cheaper with less reliance on HR staff (Chrisitie, 2001) which will enable HR to play a more consultative role with line managers and take a more active role in the organization's strategy formulation and implementation.

HR will also assume new roles in the value-creation process. For example, the HR function may shift its focus to networks of people as well as networks of computers. Social networks consisting of employee groups within an organization as well as outside of the firm will provide the synergy that combines human capital (the knowledge, skills, and abilities of an organization's work force) with social capital (the trust, mutual understanding, and shared values and behaviors that bind people together and make cooperative action possible). For example, "communities of practice" (informal relationships among individuals within and between organizations based on shared interests and expertise) that cross organizational and industry boundaries enable organizations to innovate and adapt to changing market forces (Wenger, 1998). The HR function can facilitate the accumulation of social capital by encouraging, nurturing, and supporting communities of practice that function in ways to enhance organizational effectiveness. Likewise, the HR function can monitor groups that work at cross purposes to the organization's goals or values and when necessary dissolve them.

In addition to focusing on social capital, the HR function can play a more active role in knowledge management. Now, largely the domain of information technology specialists, the HR function can help organizations design systems that employees will use and facilitate the flow of relevant knowledge — to those who need to know it, when they need to know it — in order to create new products and services, improve efficiencies in serving customers, and develop capabilities that lead to new sources of value creation. Human resource professionals with knowledge and skills in both HR and

information technology will be uniquely positioned to make the HR function a value-adding contributor to their organizations.

And, finally, HR systems are likely to be more frequently outsourced (Cafaro, 2002). Rather than struggling to maintain these systems internally, companies will relieve themselves of this burden by using third parties (e.g., PeopleSoft, Oracle, and SAP). HR professionals will become more sophisticated designers and users of systems, but they will not have to maintain them.

VI. *Research Questions*

Lest we end on an overly optimistic note, there are some unanswered questions about the future of e-HR. A solid program of research is needed in order to better understand and manage these HR innovations. The following are some research questions that provide a foundation for creating a body of scientific knowledge about e-HR.

First, e-HR has the potential to blur the boundaries of worklife and homelife. Will employees want that blurring, or will they find such efforts an invasion of work into home life? If employees can work anytime and anywhere, will expectations be created that they must do so? Or, does e-HR just make it easier and more convenient for employees to do what they may already be doing? How many managers take work home (i.e., paperwork) for managing their organizations so they can focus on it in relative peace and quiet and free of the distractions of the workplace? Now, they can still do that, only more efficiently — perhaps adding to their family life by streamlining their worklife that they take home.

Second, the shared-services model which moves personal responsibility and accountability for human resource transactions to managers and employees may meet with growing resistance if it becomes more burden than benefit. Are there limits to how much responsibility can be shared? Is there a "breakeven" point whereby further shifting of HR services to managers and employees actually detracts from employee productivity and reduces organizational effectiveness?

Third, e-HR has the potential to make employees into "information junkies," constantly checking their web pages and e-mail, eroding time that could be more productively spent actually doing value-added work. What is the effect of providing a constant flow of information to managers and employees? How much information can managers and employees productively absorb?

Fourth, e-HR tools that filter and digest information and present it to employees and managers in neat, calculated summaries, may create an over-reliance on the tools and an under-reliance on sound personal and business judgment. How do the information and decision-support tools provided by e-HR affect the quality of decision making in organizations? What are the mediators and moderators that affect the relationships between e-HR information and tools — and decision making quality?

Fifth, control and security issues will likely be a constant source of challenge. For example, should HR monitor employees' and managers' use of their time and use of their computers? Certainly technology can provide the means to do so, but what is the

impact of such monitoring on employees and managers? Some companies, such as Honeywell take a more open approach to employee use of Internet tools, and allow employees greater freedom in mixing business and nonbusiness activities during working hours (Christie, 2001). How does this approach affect employee attitudes and behaviors? When employees and managers are at home working and using proprietary information, can they be placed under the same kind of scrutiny as they are at work? How does a company insure that its proprietary information remains secure in this type environment?

Sixth, can e-HR be adapted to fit any business strategy? e-HR fits well with a company like Dell. Dell's "direct model" of business is congruent with an e-HR approach. But, what about companies that emphasize intense, face-to-face service, such as Nordstrom's? Will an e-HR system be congruent with their business strategy? What factors determine where e-HR systems will be most beneficial?

Seventh, how do you measure e-HR effectiveness and what factors determine e-HR effectiveness? The consulting firm Watson-Wyatt has developed one model to assess e-HR progression and effectiveness (Watson Wyatt, 2002). They measure e-HR progression by three variables: (1) *access*: the combined percentage of employees who use the organization's e-HR delivery channels, such as e-mail, voicemail, IVR, VRS, Internet, intranet, and HR service centers; (2) *applications*: the number of HR-related services available on the organization's e-HR delivery channels; and (3) *concentration*: the extent to which access is focused on particular delivery channels. They measure e-HR effectiveness with two variables: (1) *HR efficiency*: a combined measure of cost efficiency (HR operating budget as a percentage of total company revenue) and staffing efficiency (the number of HR staff relative to the total number of company employees); and (2) *satisfaction*: a combined measure of employee and manager satisfaction with HR services in organizations where these levels are formally reported. Watson-Wyatt reports that more e-HR progression does not necessarily result in better HR performance. This suggests that implementation effectiveness may be a necessary but not sufficient condition for e-HR effectiveness, a distinction made by researchers who have studied the implementation of manufacturing resource planning (MRP) systems (e.g., Klein et al., 2001). While the Watson-Wyatt model offers a point of departure for researchers, clearly more work is needed in developing a causal model of e-HR effectiveness.

Eighth, since a shared-services philosophy underlies the development of e-HR, how do you motivate employees and managers to actually use the system — and to use it correctly for maximum gains? Some recent surveys suggest that usage rates of e-HR systems are quite low (Anonymous, April 2002). What factors determine employee and manager usage of e-HR systems? For example, Honeywell, as described earlier, attracts users by encouraging them to mix business and nonbusiness activities during business hours. Dell encourages use through their "direct ownership" policy and by careful attention to web design issues. In addition, what organizational structure and reward system components encourage the consistent and high quality use of e-HR systems?

Ninth, e-HR systems have the potential to violate employees' perceived rights to privacy (Eddy et al., 1999). Eddy et al. studied two factors — ability to authorize disclosure and target of disclosure — on invasion of privacy perceptions and fairness perceptions. They found that providing employees with the ability to authorize disclosure of personal information along with maintaining personal information within the organization, lessens perceptions of invasion of privacy and greatly increases perceptions of fairness. However, the external validity of their study was limited, since it focused on an HRIS system used for students in an academic environment. Would the same findings occur in a corporation with an e-HR system? The policies, practices, and methods for protecting privacy vary widely across organizations. How do various e-HR policies affect employees' perceptions of privacy? How do e-HR privacy protection measures affect other employee attitudes and behaviors?

Tenth, what are the consequences of providing employees with more responsibility for their own decisions regarding many HR services? For example, by providing employees with more control over decision making regarding 401(k) plans, do employees get better results, or as some argue (Quinn, July 8, 2002), does eliminating organizational paternalism result in more employees making bad decisions with negative personal consequences? This seems to entail two separate research questions: (a) What are the effects of employees controlling more of their own HR decision making?, and (b) How can employees be educated to make more informed personal decisions on such matters as pension management?

What we currently know about e-HR is based primarily on nonscientific surveys and organizational testimonials and anecdotes. What we need is rigorous research to better understand and capitalize on the opportunities of e-HR. e-HR holds much promise for improving the way human resources are managed in businesses of the 21st century. However, along with the promise, there are also many challenges that will be created as information technology and human resources become combined in ever more symbiotic relationships. HR professionals have the opportunity to use e-HR to play a more strategic role in the operations of their businesses — something that has been much discussed in the last two decades. However, it will require a different kind of HR professional and a different kind of HR function to make that desire a reality.

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