Virtual HR: The impact of information technology on the human resource professional

Sharyn D. Gardner, a,* David P. Lepak, b and Kathryn M. Bartol c

a School of Business, The College of New Jersey, 2000 Pennington Road, Ewing, NJ 18628-0718, USA
b Human Resource Management Department, School of Management and Labor Relations, Rutgers University, Levin Building, 94 Rockefeller Road, Piscataway, NJ 08854, USA
c Department of Management and Organization, Robert H. Smith School of Business, The University of Maryland, 3339 Van Munching Hall, College Park, MD 20742-1815, USA

Received 21 February 2003

Abstract

Accelerated investment and innovation in information technology (IT) offers prospects for conducting business in ways that are radically different from the past. Despite the growing presence of IT within organizations, however, we do not have a clear understanding of how IT impacts the role of professionals. We address this issue by investigating how jobs in one professional occupational segment, human resources (HR) professionals are influenced by extensive use of IT within the human resource department. Specifically, we examine how HR professionals handle HR information as well as the expectations placed on them resulting from an increased reliance on IT. Our findings suggest that IT enables HR professionals to more efficiently access and disseminate information while it also influences what is expected of them. Implications and future directions are discussed.

© 2003 Elsevier Science (USA). All rights reserved.

Keywords: Information technology; Job roles; Human resources

* This project was funded by a grant from the Society for Human Resource Management (SHRM) Foundation. We would like to thank the SHRM Foundation for their support in this study. The views expressed here are those of the authors and do not reflect the official policy or position of the funding agency.

*Corresponding author. Fax: 1-609-637-5129.

E-mail addresses: gardner@tcnj.edu (S.D. Gardner), dlepak@rhsmith.umd.edu (D.P. Lepak), kbartol@rhsmith.umd.edu (K.M. Bartol).
1. Introduction

One of the most salient factors impacting organizations and employees today is technological change and advancement (e.g., computer-supported supplemental work-at-home, Duxbury, Higgins, & Thomas, 1996; overall labor changes, Rothman, 2000; organizational structure, Scott, 1990; organization of work, Van der Spiegel, 1995). In particular, the prominence of information technology (IT) has grown substantially in recent years. For example, in 1991 American service sector companies spent more than $100 billion on hardware (Roach, 1991), and in 1996, American banks alone spent almost $18 billion on IT (The Economist, 1996). According to the Wall Street Journal, “... information-technology outlays now account for more than one-quarter of all US investment and more than half of business spending on new machines (Anders & Thurm, 1999).” They note that annual business investment in IT increased 30% in 1998, with double-digit gains for each of the previous seven years. This accelerated investment and innovation in IT offers prospects for conducting business in ways that are radically different from the past.

One implication is that the nature of work is likely to shift as IT has the potential to change the roles of employees within organizations. Yet, while researchers have investigated the impact of IT on managerial decision-making (Nord & Nord, 1995; Sayeed & Brightman, 1994), attitudes toward IT (Ray, Sormunen, & Harris, 1999), employee health and stress issues (Palvia & Tung, 1994), and user technology acceptance (Davis, 1989), researchers have not generally explored how IT impacts individual jobs aside from issues related to telecommuting (Duxbury et al., 1996).

The primary purpose of this study was to address this issue by investigating how jobs in one professional occupational segment, human resources (HR), are influenced by extensive use of IT. The human resource management department is one functional area that is increasingly utilizing information technology. According to Workforce, many smaller companies already use service providers for payroll, and training departments are rapidly incorporating online classes as well as video technology (Temple, 2000). What has not been outsourced in IBM’s HR department has been converted almost entirely to electronic tools for benefits enrollment, retirement planning, online learning, and the like (Greengard, 2000). With this growth in IT utilization, practitioners and researchers alike recognize that IT may have a tremendous impact on the different functions and individuals in the organization. Ulrich, for instance, has argued that, “technology will change how work is done in general and how HR [human resources] is practiced in particular” (1997a, p. 178). As the human resource management function increases its use of IT, there are likely to be implications for HR professionals as well (cf. Sparrow & Daniels, 1999). Thus, the human resource function provides an appropriate venue within which to consider the impact of IT on professional workers. Specifically, we examine how HR professionals handle HR information as well as the expectations placed on them resulting from an increased reliance on IT.
2. Theory and hypotheses

In the past few years, researchers have viewed HR roles as transitioning from operational, administrative, functionally oriented, and reactive toward more strategic, consultative, business oriented, and proactive, respectively (Ulrich, 1997b). For instance, Ulrich has argued that these roles are imperative if HR professionals expect to create value and deliver results to the firm. Given growing pressure for HR professionals to become more of a business partner and deliver beyond day-to-day tasks to support the development and implementation of organizational strategy (Burack, Burack, Miller, & Morgan, 1994; Carrig, 1997), many HR professionals must fill several different roles simultaneously.

Specifically, Ulrich (1997b) defined four roles the HR professional must fulfill in order to create a business partnership with the firm with the expectation that this will add value. The first, management of strategic human resources, requires that HR professionals be able to execute strategy and become a “strategic partner.” By being a strategic partner, HR professionals help manage human resources and align HR practices with business strategy. Second, HR professionals must manage the firm administrative infrastructure through “administrative expertise” by designing and delivering efficient HR processes for staffing, training, and the like. The third role, management of employee contribution, has HR professionals striving to increase employee commitment and capability through the role of “employee champion”; they manage employee contribution by providing resources to employees. And finally, management of transformation and change requires that the HR professional create a renewed organization, as a change agent, by ensuring there is a capacity for change as well as managing the fundamental culture of the organization.

In these roles, HR professionals may manage strategic activities, provide client services, help build human capital, as well as manage company change. But as HR professionals strive to fill these roles and add value to the firm, increased IT use may impact aspects of these roles in different ways. In the next section, we briefly describe research regarding the framework of IT impact, consider the potential enabling and shifting effects of IT use on work roles, and provide corresponding hypotheses.

2.1. IT framework

In the IT literature, one of the most prominent frameworks of IT impact includes three stages of use: automation, information, and transformation (Remenyi, Money, & Twite, 1991; Zuboff, 1988). This framework of IT impact is developmental in that each stage is inherent in the technology but must be developed in order to be accessed or exploited. In the automation stage, IT is used primarily to automate manual systems and reduce the need of personnel to perform routine activities. According to Zuboff (1988), IT automation often reduces the amount of routine work that must be done, potentially providing more opportunities for individuals to think and use their full cognitive capacities. For example, within HR, the automation of repetitive administrative activities, such as personnel reporting and record
keeping, may allow professionals to focus less on administrative activities and more on interpreting information.

When IT “informates” it goes beyond simple automation to provide increased effectiveness and benefits for those who use the system. Informating IT provides a deeper level of transparency to activities, events, and objects by generating “… information about the underlying productive and administrative processes through which an organization accomplishes its work (Zuboff, 1988, p. 9).” Individuals know more about what is occurring in their unit or the organization through an increase in the comprehensiveness of information provided by IT. This exposure may allow individuals to more easily access and evaluate information and address HR issues. For example, HR professionals might access and assess personnel statistics once an HRIS system is in place that would not have been easily accessible without such a system. Skills and demographic information not previously accessible may be assessed and appraised in order to address specific manpower issues.

IT may also have transformational impact such that it “… defines a company with new business operations and practices… transformation places creativeness, knowledge and information, as top company assets (Brady, Saren, & Tzodkas, 1999, p. 759).” In this context, IT contributes to product, service, and strategic innovations as it is utilized in order to increase competitive flexibility and capability (Mooney, Gurbaxani, & Kraemer, 1995). In HR, a transformational impact might foster a new culture or mindset as professionals try to think outside the box to formulate various innovations. IT transformation may also lead HR professionals to create innovative practices or to innovatively deliver HR practices to their clients. These ideas parallel recent visualizations of the potential progression of IT use in the HR function: from simple information publishing to HR workflow over the web (LeTart, 1998).

According to this framework, the use of IT in HR has the potential to both enable as well as constrain the work roles of employees. According to Zuboff (1988, pp. 10–11)

… as long as the technology is treated narrowly in its automating function, it perpetuates the logic of the industrial machine… decreasing the dependence on human skills. However, when the technology also informates the processes to which it is applied, it increases the explicit information content of tasks and sets into motion a series of dynamics that will ultimately reconfigure the nature of work.

The first of these two scenarios—automation—has an established presence within HR. Indeed, firms have put transactional processes online to enable managers and employees access (Groe & Pyle, 1996) and have used technologies such as interactive voice response technology (Hatlevig, 1995) for benefits information and the like. Moreover, when used to automate certain tasks, IT may enable professionals to spend more time interpreting and using information. One logical result is that as firms increase this use of IT, the role of informational and transformational IT stages may garner more focus. In other words, IT may enable HR professionals to focus on certain informational aspects and may also be a catalyst in modifying how HR professionals use their time. In our study, we consider the impact of IT on the roles of HR professionals as they generally relate to information and transformation.
2.2. Informational impact (IT as an enabler)

The automation of HR activities may impact the role of HR professionals by absorbing information-intensive tasks (Snell, Pedigo, & Krawiec, 1995; Zuboff, 1988) and provide HR professionals more time to spend on other aspects of their jobs. As IT is used more extensively, it might enable HR professionals to access more information, allow them to answer queries from employees and managers in a timely fashion, and enable them to be more efficient at handling complex information as repetitive job tasks are automated. For example, Mutch (1998) found that the impact of increased IT use led to an incorporation of formerly separate tasks into practice in a welding workshop, consequently making workshop practice more efficient by reducing time spent on separate tasks. Haines (1999) found that newly implemented technology increased knowledge, productivity, and staff skills at a government agency. In addition, anecdotal evidence suggests that HR staff can be more efficient at their work with the right automation tools (Greengard, 1999). As more HR professionals are able to be more responsive, answer queries more quickly, and provide more accurate information, IT may enable HR professionals to increase their responsiveness to their constituencies. Thus, with more extensive use of IT, we expect HR professionals to be able to provide increased information responsiveness.

Hypothesis 1: More extensive use of IT enables increased information responsiveness by HR professionals.

In addition to information responsiveness, extensive use of IT may also increase the clarity, transparency, and comprehensiveness of information employed by HR professionals. By informating activities, IT bundles information so that HR professionals can access this information and evaluate what was not previously accessible. IT systems aid in gathering and bundling this information so that HR professionals may be more independent from the clients that they serve. For example, in one study IT was found to be associated with greater autonomy for middle managers as well as less predetermined decision procedures (Pfeffer & Leblebici, 1977). In another study, managers perceived IT as improving their confidence in decision making, removing uncertainty from decisions, and overall increasing their role in the organization (Buchanan & McCalman, 1988). Snell et al. (1995) suggest that increased HR autonomy may result from employees using sites such as kiosks and web applications that are a result of increased IT usage. Thus, we expect that more extensive use of IT will enable HR professionals to be more autonomous in handling HR information.

Hypothesis 2: More extensive use of IT enables greater information autonomy for HR professionals.

HR professionals not only provide client services, but they are also pressed to stay current on HR policies, activities, and employment practices in their industry. Laws in each state are constantly changing so that in order to be current, information must continually be sought out and other professionals contacted. In addition, HR professionals are pressed to constantly examine and improve HR processes in order to add value to the business (Ulrich, 1997b). As the extent of IT use increases, HR
professionals are more likely to have increased opportunity to make connections to information from external sources. An IT system may connect an organization to the Internet, and thus allow HR professionals to access other organizations and points of reference to gather information that they need to remain current in their industry. Bahrami and Evans (1997) argue that by having increased information connectivity, HR professionals can demonstrate flexibility in the event of unanticipated change. This characteristic may be advantageous and desirable as HR tries to increase value and contribution to the organization. Thus, we expect that a more extensive use of IT will enable HR professionals to increase their link to external professionals.

Hypothesis 3: More extensive use of IT enables HR professionals to make greater use of external professional links.

2.3. Transformational impact (IT as a catalyst)

As IT enables HR professionals to perform different activities in their job role, there is also a possibility that IT may act as a catalyst by modifying professionals’ job role focus. For instance, Ulrich suggested that HR professionals tend to perform four work roles, one of them focusing on being a strategic partner to the firm. Recent literature has suggested that HR might benefit by adopting a more strategic role in organizations and placing less emphasis on administrative duties (Albers Mohrman & Lawler, 1997; Beatty & Schneier, 1997; Snell, Youndt, & Wright, 1996; Ulrich, 1997a).

HR executives are relying on IT as a means to hold a more strategic role. As suggested by Ulrich (1997c), HR information technology efforts can ultimately be linked to better organizational performance because they allow the HR function to devote more time to strategic issues. Snell et al. (1995) also suggest that IT helps HR as it becomes a more horizontal and self-learning organization, by enabling HR to contribute to the strategic focus of the organization. Various authors have argued that IT absorbs the information intensive, but low value-added tasks and leaves more time to focus on strategic issues and customized activities (Lepak & Snell, 1998). For example, Buchanan and McCalman (1988) found that managers felt that IT helped them remove uncertainty from decisions and overall increased their presence in the organization. Similarly, Wooldridge and Floyd (1990) found that managers perceived that IT allowed them to be more involved in strategy implementations and the development of organizational structure and reward systems.

With more extensive use of IT, there will likely be more time available for HR professionals to allot to other activities as they transform current activities and focus on business operations and practices. We expect that HR professionals will be expected to spend more time attending to organization wide issues, strategy development issues, and organizational change efforts. These transformational activities directly impact the organization and aim at developing different aspects of the firm. Extensive use of IT will likely influence the HR professionals’ focus as they may be expected to spend more time toward efforts to improve the organization. As Ulrich (1997b) states, this is the HR professional becoming a strategic partner, as he/she professionally manages strategic human resources and aligns HR with business
strategy. Thus, we expect that more extensive use of IT will require HR professionals to spend more time on broader and more transformational issues.

Hypothesis 4: More extensive use of IT requires HR professionals to spend more time on transformational activities.

At the same time that more extensive use of IT requires more time spent on transformational activities, implementation of new information technologies may also require HR professionals to spend more time on IT-related support activities to guide the users of the systems (Bhattacherjee & Hirschheim, 1997; Halachmi, 1992). It is difficult to implement a system with little training and expect the users to be able to operate without ongoing support. For example, Broderick and Boudreau (1992) have found that increased use of IT is changing the needed skill mix for HR professionals in the direction of greater desirability of information systems (IS) training. It has also been found that IS professionals are increasingly being hired into HR (Lawler, 1992).

Many researchers have argued that IT increasingly deskills professional and managerial work (Bjorn-Andersen & Pedersen, 1980; Leavitt & Whisler, 1958; Tolsby, 2000; Zmuidzinas, Kling, & George, 1990) as it displaces humans and their know-how. In contrast, more extensive use of IT may reskill work (Zuboff, 1988) or at least alter the required skill set by requiring new knowledge and skills in order for workers to utilize the new systems. IT influences the focus of work that HR professionals perform by focusing more time on activities related to IT support, such as maintaining and developing IT-based HR applications. Thus, we anticipate that more extensive use of IT in the HR function will require HR professionals to spend more time on IT support activities.

Hypothesis 5: More extensive use of IT requires HR professionals to spend more time on IT support activities.

2.4. Moderating factors

The impact of IT on HR professional job roles is of primary interest in our study, yet there are certain factors that might influence the hypothesized relationships. Existing literature shows that age and gender may have some influence on users of IT. Specifically, age has been found to have a direct effect on usage of technology as older workers may be less able or likely to process complex information processing tasks (Birren, Woods, & Williams, 1980). This suggests that older workers may not be able to handle the high information load that may come with IT use and thus may not use IT as much as younger workers. In addition, older workers may have a more difficult time adapting to the changing work environment (Dalton & Thompson, 1971; Forteza & Prieto, 1990; Meyers & Conner, 1992; Sharit & Czaja, 1994). Because of this, older workers may not be able to adapt to the increasing amount of IT in the workplace. Further, research has shown that older workers tend to learn at a slower pace than younger workers (Sterns & Doverspike, 1989) and thus IT may not have the same impact on their work because of the increased learning curve. Specifically, they may not learn how to use IT in the workplace as quickly and not use the IT systems,
and thus IT may not impact their work in an enabling fashion as we expect. We thus expect that increased age will have a negative impact on the relationships in which there is more extensive use of IT, such that older HR professionals will show a lower impact or change in their job because of their lack of use of the IT systems.

Hypothesis 6a: HR professional age will negatively moderate the relationships between extent of IT use and enabling information responsiveness, information autonomy, and external professional links, such that the magnitude of the relationship will be smaller with older HR professionals.

Hypothesis 6b: HR professional age will negatively moderate the relationships between extent of IT use and requiring time on transformational activities and IT support activities, such that the magnitude of the relationship will be smaller with older HR professionals.

In addition to age, gender has also been found to influence the use of IT. According to the literature, men tend to be more confident computer users (Eining, Brown, & Cook, 1992; Furger, 1998; Gill & Grint, 1995) while women tend to display lower computer aptitude (Felter, 1985), higher levels of computer anxiety (Igbaria & Chakrabarti, 1990; see Rosen & Maguire, 1990 for a review), and have even been shown to have less confidence in using email (Hoxmeier, Nie, & Purvis, 2000) suggesting that women may be less likely to use IT systems than men. Recently, Bozionelos (1996) found evidence that women tend to be more anxious than men in an authentic realistic setting rather than in the laboratory. In addition, women and men have been found to have different levels of acceptance of new technology due to attitudes toward new technology, subjective norms and perceived behavioral control (Venkatesh, Morris, & Ackerman, 2000) such that men are more focused in their technology usage and are task oriented and more accepting of new technology. Thus, based on this literature we expect that gender will positively influence the extent to which IT use impacts the roles of HR professionals, such that male HR professionals will show more positive magnified relationships between the variables.

Hypothesis 7a: Gender will positively moderate the relationships between extent of IT use and enabling information responsiveness, information autonomy, and external professional links, such that the magnitude of the relationship will be larger with male HR professionals.

Hypothesis 7b: Gender will positively moderate the relationships between extent of IT use and requiring time on transformational activities and IT support activities, such that the magnitude of the relationship will be larger with male HR professionals.

In addition, HR functional orientation, which indicates whether HR professionals are generalists or functional specialists, may serve an important moderating role. HR specialists typically function in one discipline, while generalists adopt a more broad orientation that emphasizes breadth rather than depth of knowledge (Cesare & Thornton, 1993). On the one hand, functional specialists are likely to be more adept in their specialty area, possessing in depth knowledge of the IT functions related to their specialty.
As the extent of use of IT increases, functional specialists will likely be familiar with the IT system as it pertains to their particular domain performing tasks in their specialized roles. This familiarity will be beneficial and being a functional specialist may positively moderate the impact of the extent of use of IT on its enabling possibilities as well as its change in job focus, but only in the HR professionals’ specific specialty area.

On the other hand, HR generalists may be more adept at using multiple IT systems as they are exposed to a variety of activities. Although they do not typically have the knowledge depth in one area as specialists do, they have breadth of knowledge of various systems. This familiarity with many different systems may enable HR generalists to adapt with more extensive use of IT than HR specialists. Because HR responsibilities have been spread around the organization through decentralization of HR tasks to more local parts of the organization and devolution of HR tasks by allocating them to line managers (Hoogendoorn & Brewster, 1992; Tannenbaum, 1990), it is critical that HR professionals are familiar with many different systems and are able to utilize their IT systems effectively. With this diffusion of HR responsibilities to other parts of the organization, HR professionals are better served having some knowledge of all aspects of HR and thus generalists will be able to provide this knowledge of the differing IT used. Based on this logic, we expect being an HR generalist will positively moderate the impact of the extent of use of IT, such that HR generalists will show magnified relationships between the variables.

Fig. 1. Model tested.
Hypothesis 8a: HR functional orientation will positively moderate the relationships between extent of IT use and enabling information responsiveness, information autonomy, and external professional links, such that HR generalists will have a significantly stronger relationship than HR functional specialists.

Hypothesis 8b: HR functional orientation will positively moderate the relationships between extent of IT use and requiring time on transformational activities and IT support activities, such that HR generalists will have a significantly stronger relationship than HR functional specialists.

The above hypotheses are summarized graphically in Fig. 1.

3. Method

3.1. Participants and procedures

Primary participants were HR professionals working for a sample of HR executives whose names and contact information were provided by the Society for Human Resource Management (SHRM). Our primary data came from the HR professionals, but we also obtained information about IT usage from the HR executives themselves in order to collect information from multiple respondents in each organization and diminish concerns with common method bias. To obtain study data, we mailed surveys to 1969 HR executives in various organizations from a total sample of 2019 received from SHRM (50 were randomly selected for pilot testing). Of these, 155 were returned as undeliverable because executives had left the company or were inaccessible via postal mail, reducing our sample size to 1814 members. A total of 455 HR executives completed surveys for a response rate of 25.1%. To check for non-response bias between the participating and non-participating firms in our study, we collected additional data from all 120 non-participating public firms. Our sample consisted of public, private, and non-profit firms and we were able to collect data in regard to the public firms of our non-respondents through the Research Insight database (Research Insight, 2000). The results of the analysis of variance (ANOVA) indicate no significant differences with regard to company size between the 130 participating public firms and the sample of non-participating firms.

Initial surveys were mailed to all potential HR executive respondents and included a request that the respondent ask two of their HR professionals to complete surveys that were enclosed with the HR executive survey. Specifically, we stated in the HR executive cover letter: “To obtain an in-depth understanding of how the introduction of information technologies into HR is impacting HR staff, we also ask that you distribute each of the two enclosed brief HR Professional Surveys to an HR professional in your unit.” This created a potential sample of 910 HR professionals (two professionals for each HR executive responding). Follow up mailings were completed in order to obtain as many responses as possible. We received a total of 567 HR professional surveys for a response rate of 62.3%.
Although there were 455 HR executive respondents and 567 HR professional respondents, some participants did not answer all survey items. In addition, our analysis required at least one HR executive and one HR professional from each organization. In cases for which there were two HR professionals responding from one company, these cases were treated as independent rather than aggregated to the company level as our phenomena of interest was at the individual level in regards to how the extent of IT use affected the HR professionals job. Due to 174 unmatched cases and cases with missing data, this resulted in a usable sample of 357 complete cases. Analysis of the demographic data for the sample of HR professionals showed that their mean age was 40, with a range from 22 to 64 years old, and 81% had a baccalaureate degree. The sample of HR executives showed that their mean age was 49, with a range from 26 to 70 years old, and 86% had a baccalaureate degree.

3.2. Measures

Survey items were developed from a review of the literature and interviews conducted with HR executives from twenty organizations not included in the sample. Because many of the constructs had not been measured previously, we relied on past research to obtain general insights and used interviews with HR executives to obtain further information and verification of their importance. We conducted twenty interviews of 45–90 min. in length with an HR executive in each organization. Each interview was audio taped and transcribed. These interviews were used to provide clarification regarding the use and effects of IT on the jobs of HR professionals. We then constructed measures that investigated the extent of IT use in the organization and the various impacts IT use could have on the roles of HR professionals. Both the interview data and review of the literature suggested that the concepts we were investigating were the most important to executives as well as valid constructs. Our original instruments were pilot tested with these 20 organizations and refined further based on the interviews. The refined instruments were then pilot tested with 50 randomly selected participants from our original sample who were subsequently removed. Results from the pilot sample enabled us to clarify our measures and thus finalize our survey for distribution.

Extent of use of IT. We measured extent of use of IT through an index created from information reported by the HR executive. The IT index was created from responses regarding the extent to which the HR executive perceived that the organization relied on IT in 11 HR activities in benefits, training, and recruitment. Specifically, HR executives indicated the extent of IT use in their: benefits enrollment system and general information about benefits; training of non-exempt employees, exempt non-managerial employees, and managerial employees and training delivery; external recruiting of non-exempt and exempt workers, internal recruiting for non-exempt and exempt workers, and resume banks. The scale used a five-point Likert response format (1, very low, to 5, very high). These items were included in the index because they represent activities in which HR invests in information technology applications (Broderick & Boudreau, 1992; Greengard, 1999; Wilcox, 1997). Higher scores indicated a higher level of IT use.
Impact on the role of the HR professional. Five dimensions were used to capture the impact of IT on the HR professional role. Items for each dependent variable were averaged to create a scale score. Enable information responsiveness was a 7-item scale that assessed the degree to which HR professionals are enabled to provide responsive information service to employees, managers, and upper-level managers of the organization (e.g., The extent to which using information technology enables you to provide more timely information to line managers). Enable information autonomy was a 2-item scale that assessed the degree that HR professionals are enabled to perform information activities independently of line managers (e.g., The extent to which using information technology enables you to make fewer requests to line managers for routine information). Enable external professional link was a 4-item scale that assessed the degree that HR professionals are linked to professional sources external to the organization (e.g., The extent to which using information technology enables you to be more connected to professional associations). Requirement of time on transformational activities was a 9-item scale that assessed the degree that HR professionals are required to spend time on activities focused on broad transformational, strategic, and organizational issues (e.g., The extent to which using information technology requires you to spend more time planning organizational change efforts). Requirement of time on IT support activities was a 4-item scale that assessed the degree that HR professionals are required to spend time on activities that focus on IT support related to the HR IT system in place in the organization (e.g., The extent to which using information technology requires you to spend more time dealing with glitches in IT-based HR systems). These data were collected from responses of the HR professionals. All five variables were measured using a five-point Likert response format (1, not at all, to 5, to a great extent). Higher scores indicated a higher level of each variable.

Three variables expected to moderate the relationships in our model were included in the study, age, gender and functional orientation. Functional orientation was measured by asking the HR professionals to indicate whether they were a generalist or a functional specialist. Age, gender, and functional orientation were also collected from responses of the HR professionals.

Control variables. Organizational size was used as a control variable because of the possibility that larger organizations may have more resources to invest in IT. In addition, we also controlled for HR department size because larger HR departments may have more staff and resources with which to provide more services and spend more time on different activities. We measured both control variables by asking HR executives to report the number of employees in the organization and the number of full time employees in their HR department. Because the variables were skewed and not normally distributed, we transformed them using the natural logarithmic function.

4. Analysis and results

Means, standard deviations, reliabilities, and correlations for all study variables are reported in Table 1. All multi-item scales had internal consistencies of at least
Table 1
Means, standard deviations, reliabilities, and correlations among study variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Natural log of org. size</td>
<td>7.272</td>
<td>1.57</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Natural log of # employees in HR</td>
<td>2.324</td>
<td>1.21</td>
<td>.66***</td>
<td>.15**</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Age</td>
<td>39.88</td>
<td>9.74</td>
<td>.19***</td>
<td>.15**</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Gender^b</td>
<td>1.70</td>
<td>.46</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Functional orientation^c</td>
<td>1.43</td>
<td>.51</td>
<td>.10</td>
<td>.16**</td>
<td>.05</td>
<td>.01</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. IT index</td>
<td>2.45</td>
<td>.75</td>
<td>.14**</td>
<td>.26***</td>
<td>.08</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Information responsiveness</td>
<td>3.57</td>
<td>.85</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
<td>.05</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Information autonomy</td>
<td>3.25</td>
<td>1.04</td>
<td>.06</td>
<td>.09</td>
<td>.04</td>
<td>.05</td>
<td>.19***</td>
<td>.67***</td>
<td>.87*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. External professional link</td>
<td>2.98</td>
<td>1.00</td>
<td>.03</td>
<td>.04</td>
<td>.01</td>
<td>.03</td>
<td>.09</td>
<td></td>
<td>.12*</td>
<td>.38***</td>
<td>.25***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Transformational activities</td>
<td>2.80</td>
<td>.85</td>
<td>.08</td>
<td>.05</td>
<td>–</td>
<td>.00</td>
<td>.13*</td>
<td>.10</td>
<td>.34***</td>
<td>.33***</td>
<td>.32***</td>
<td>.93</td>
<td></td>
</tr>
<tr>
<td>11. IT support activities</td>
<td>2.81</td>
<td>.98</td>
<td>.12*</td>
<td>.10</td>
<td>.06</td>
<td>–</td>
<td>.02</td>
<td>.23***</td>
<td>.11*</td>
<td>.33***</td>
<td>.24***</td>
<td>.26**</td>
<td>.45***</td>
</tr>
</tbody>
</table>

N = 357 for all correlations.
* p < .05.
** p < .01.
*** p < .001.
^a Coefficient x reported in parentheses on the diagonal.
^b 1 = male; 2 = female.
^c 1 = generalist; 2 = functional specialist.
Table 2
Hierarchical regression testing

<table>
<thead>
<tr>
<th>Enable informational responsiveness</th>
<th>Enable information autonomy</th>
<th>Enable external professional link</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td><strong>Step 2</strong></td>
<td><strong>Step 3</strong></td>
</tr>
<tr>
<td>Org. size</td>
<td>-.12</td>
<td>-.11</td>
</tr>
<tr>
<td>Number of HR employees</td>
<td>.14</td>
<td>.07</td>
</tr>
<tr>
<td>IT index</td>
<td><strong>.22</strong>*</td>
<td><strong>.22</strong>*</td>
</tr>
<tr>
<td>Function</td>
<td>.10*</td>
<td>.33</td>
</tr>
<tr>
<td>Gender</td>
<td>.02</td>
<td>.18</td>
</tr>
<tr>
<td>Age</td>
<td>-.06</td>
<td>-.15</td>
</tr>
<tr>
<td>IT x function</td>
<td>-.31</td>
<td></td>
</tr>
<tr>
<td>IT x gender</td>
<td>-.24</td>
<td></td>
</tr>
<tr>
<td>IT x age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adj. $R^2$</td>
<td>.01</td>
<td>.05***</td>
</tr>
<tr>
<td>$ΔR^2$</td>
<td>.01</td>
<td>.04***</td>
</tr>
<tr>
<td>$F$</td>
<td>2.04</td>
<td>7.34***</td>
</tr>
</tbody>
</table>

**Require time spent on transformational activities**

<table>
<thead>
<tr>
<th><strong>Step 1</strong></th>
<th><strong>Step 2</strong></th>
<th><strong>Step 3</strong></th>
<th><strong>Step 4</strong></th>
<th><strong>Step 1</strong></th>
<th><strong>Step 2</strong></th>
<th><strong>Step 3</strong></th>
<th><strong>Step 4</strong></th>
<th><strong>Step 1</strong></th>
<th><strong>Step 2</strong></th>
<th><strong>Step 3</strong></th>
<th><strong>Step 4</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Org. size</td>
<td>.08</td>
<td>.08</td>
<td>.09</td>
<td>.10</td>
<td>.09</td>
<td>.10</td>
<td>.10</td>
<td>.10</td>
<td>.09</td>
<td>.10</td>
<td>.10</td>
</tr>
<tr>
<td>Number of HR employees</td>
<td>.00</td>
<td>-.03</td>
<td>-.05</td>
<td>-.06</td>
<td>.05</td>
<td>.02</td>
<td>-.02</td>
<td>-.02</td>
<td>.00</td>
<td>-.01</td>
<td>-.01</td>
</tr>
<tr>
<td>IT Index</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Function</td>
<td>.10</td>
<td>.10</td>
<td>.63</td>
<td>.11*</td>
<td>.10</td>
<td>.20</td>
<td>.34</td>
<td></td>
<td></td>
<td>.34</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>.13*</td>
<td>.34</td>
<td></td>
<td>.22***</td>
<td>.34</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-.05</td>
<td>-.05</td>
<td></td>
<td>.03</td>
<td>.07</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT x function</td>
<td>-.31</td>
<td></td>
<td></td>
<td>-.16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT x gender</td>
<td>-.41</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT x age</td>
<td>-.05</td>
<td></td>
<td></td>
<td>-.07</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adj. $R^2$</td>
<td>.00</td>
<td>.01</td>
<td>.02</td>
<td>.02</td>
<td>.01*</td>
<td>.02*</td>
<td>.06***</td>
<td>.06</td>
<td>.00</td>
<td>.01</td>
<td>.01</td>
</tr>
<tr>
<td>$ΔR^2$</td>
<td>.00</td>
<td>.01</td>
<td>.01</td>
<td>.00</td>
<td>.01*</td>
<td>.01*</td>
<td>.04***</td>
<td>.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$F$</td>
<td>1.01</td>
<td>1.70</td>
<td>1.93</td>
<td>1.73</td>
<td>3.14*</td>
<td>3.42*</td>
<td>4.96***</td>
<td>3.35*</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Require time spent on IT support activities**

<table>
<thead>
<tr>
<th><strong>Step 1</strong></th>
<th><strong>Step 2</strong></th>
<th><strong>Step 3</strong></th>
<th><strong>Step 4</strong></th>
<th><strong>Step 1</strong></th>
<th><strong>Step 2</strong></th>
<th><strong>Step 3</strong></th>
<th><strong>Step 4</strong></th>
<th><strong>Step 1</strong></th>
<th><strong>Step 2</strong></th>
<th><strong>Step 3</strong></th>
<th><strong>Step 4</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Org. size</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of HR employees</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT Index</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Function</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT x function</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT x gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT x age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adj. $R^2$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$ΔR^2$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$F$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N = 365
N = 362
N = 365

Standardized $β$ weights reported.

* $p < .05$.

** $p < .01$.

*** $p < .001$. 

.87 using Cronbach’s $\alpha$ (Nunnally, 1978). Prior to the primary analyses, confirmatory factor analyses were conducted to empirically demonstrate that the dependent variable constructs were distinct concepts. The analysis used all 26 items of the dependent variables measuring how IT impacts HR professionals’ jobs and specified the five latent constructs. The fit statistics were: $\chi^2 = 623.24$ (288 df, $p < .001$), comparative fit index (CFI) = .953, standardized root mean-square residual (SRMR) = .164, and root-mean-square error of approximation (RMSEA) = .057 (.051, 0063). These values indicate an acceptable fit (Bollen, 1989; Hu & Bentler, 1999) and suggest that the five factors are distinct constructs.

Hierarchical regression was used to test the hypotheses. The results for each of the five dependent variables are shown in Table 2. We entered the control variables, organization size and number of HR employees, in the first step in each regression. The IT index was entered in step two to test for the direct effect of extent of use of IT. The three moderators, age, gender, and functional orientation were entered in step three. We then tested the expected moderators, age, gender, and functional orientation using the methods recommended by Aiken and West (1991) in the final step.

In support of hypothesis 1, the results indicated that more extensive use of IT enabled HR professionals to provide increased information responsiveness ($\beta = .22$, $p < .001$). Results also supported hypothesis 2, indicating that more extensive use of IT enabled HR professionals to have more information autonomy ($\beta = .18$, $p < .01$). Confirmation was also found for hypothesis 3 specifying that more extensive use of IT is positively related to better external professional links ($\beta = .12$, $p < .05$). Regarding hypotheses 4 and 5, the results indicated that more extensive use of IT is positively associated with HR professionals spending more time on IT support activities ($\beta = .11$, $p < .05$).

According to Table 2, there were no significant results regarding the moderating effects for age, gender, and functional orientation. However, there were some unexpected direct effects of functional orientation. Specifically, the results indicate that functional orientation directly affected enabling information responsiveness, such that being a functional specialist had a positive relationship ($\beta = .10$, $p < .05$). In addition, functional specialists reported increased time demands for both transformational activities and IT support activities ($\beta = .13$, $p < .05$; $\beta = .22$, $p < .001$, respectively).

5. Discussion

From a theoretical perspective, our results build on the Zuboff (1988) and Remenyi et al. (1991) notion that extensive use of information technology impacts the HR professional job role through influencing informational demands on these employees as well as demands for providing IT support. HR has experienced considerable automation both through a growth in the establishment of computerized human resource information systems (LeTart, 1998; Tannenbaum, 1990) and the adoption of specific applications in such areas as payroll, training, and benefits (Broderick & Boudreau, 1992; Greengard, 1999; Groe & Pyle, 1996; Hatlevig, 1995; Wilcox,
HR professionals in our study reported being enabled to provide increased information responsiveness to the clients that they served as well as to act autonomously when handling information. Our results support this theorized impact suggesting that with more extensive use of IT, HR tasks are further automated making HR professionals more efficient through their responsiveness and autonomy.

IT’s informing impact “… involves the expansions of employees’ intellectual skills and knowledge (Hayes & Walsham, 2000, p. 64)” and IT’s transforming impact may lead HR professionals to create new innovative practices or to innovatively deliver HR practices to their clients. The HR professionals in our study were able to connect to more external professional links as a result of more extensive use of IT suggesting a potential for them to learn of more innovative ways in which to deliver HR activities. They also spent more time on IT support activities, suggesting that more extensive use of IT turned HR professional focus toward more knowledge based activities as they shifted more attention to developing IT-based HR applications.

Our findings also suggest that IT is related to two distinct aspects of HR professional roles: enabling aspects as well as time shifting aspects. First, our results indicate that HR professionals are enabled to provide increased information responsiveness, have more information autonomy, and have more external professional links. As IT automates and informs activities, HR professionals can spend less time on routine and repetitive tasks and focus on more meaningful information responsiveness, working autonomously and connecting with outside professionals to access information. One implication of these findings is that IT appears to serve as an empowering function for HR professionals, providing a medium in which HR professionals can provide increased value in their work. IT is one tool that HR professionals can utilize in order to provide more value to the organization (Ulrich, 1998).

At the same time, however, respondents in our study indicated that more extensive use of IT requires them to provide IT related support activities. These findings suggest that HR professionals are expected to spend more time on various IT support activities, such as maintaining IT-based HR applications and dealing with glitches in these systems. As expected, IT has a considerable influence as a catalyst and emphasizes new job activities in which HR professionals concentrate. With this focus, HR professionals may need to be able to supplement their skills and increase their know-how in order to improve their contributions to the organization through their support of IT. They may need to develop their skills to provide these expected services, or as more is expected of HR staff, higher quality personnel may need to be hired to replace those lacking the needed skills and knowledge in regards to IT.

Taking these two aspects together, it appears that IT enables HR professionals to more efficiently access and disseminate information while it also shapes and changes what is expected of them in their jobs. In order to provide these IT support activities, our results support the notion that IT is changing the needed skill mix for HR professionals in the direction of greater desirability of IS training (Broderick & Boudreau, 1992) and HR professionals may need to learn new skills in areas of IT that they may not already possess. Viewed in combination, it appears that rather than deskilling work, IT can reduce the amount of time that individuals spend on routine
tasks and thus, at least for HR professionals, require that individuals learn new skills that will aid them in corresponding new job expectations.

Moreover, while the results do indicate that IT is statistically related to time spent on IT support activities, this effect appears to be somewhat weaker than the results of the enabling activities. IT is clearly, and strongly, related to enabling activities suggesting that while HR professionals may need to acquire specific skills in order to address needed IT support activities, IT may be more important as a driver of efficient information access and dissemination for HR professionals. Thus, practitioners may want to focus on the benefits of IT for HR professional support to employees in the organization. Additionally, research would benefit from further examination of these concepts to better understand what specific aspects of IT support activities are needed for the HR professional.

One interesting point to note in our findings is that although there were significant results that indicate that higher levels of extent of use of IT do lead to changes in the HR professional’s job, these results suggest that there is considerably more variance to be explained. Thus it is likely that additional factors may influence the relationship between IT use and the jobs of HR professionals. For instance, it might be the case that the climate for IT use within HR departments influences the extent to which IT actually influences the jobs of HR professionals. If IT is implemented in a climate where employees resist change towards any technology, there may be lack of use of IT and thus no direct influence on the jobs of HR professionals. It may also be the case that the type of IT implemented may influence the extent to which IT influences the jobs of HR professionals. If the IT implemented is not compatible with the job or job duties of HR professionals, there may be a diminished influence on their jobs. Additionally, employee’s prior experience may influence the extent to which increased use of IT impacts jobs of HR professionals. We would encourage additional research that examines the climate of IT use within HR, the match of the type of IT and the jobs of HR professionals, as well as employee prior experience with IT as factors that may impact the influence of IT on HR professionals.

Interestingly, we did not find support for the moderating effects of gender, age, or functional orientation. Yet, the results do indicate that being a functional specialist is positively related to level of information responsiveness, as well as time spent on transformational and IT support activities. These findings suggest that functional specialists in particular may be influenced by increased use of IT, perhaps because the increasing sophistication of HR applications are likely to be associated with functional specialties, such as compensation and benefits. Yet even as they specialize in one area, functional specialists appear to be more influenced by IT to spend more time on transformational issues, contributing to the broader strategic issues of the organization. While more research is needed to delve deeper into these issues, the findings suggest that an increase in the extent of use of IT is associated with increased information responsiveness and shifts in expectations of HR professionals. In building on our findings, future research could investigate the extent to which IT might allow functional specialists to continually enhance the depth of their specialized knowledge and expertise, while simultaneously increasing its scope. Such prospects
could greatly enhance the ability of professionals to handle their specializations and simultaneously contribute to more strategic and transformational initiatives in their organizations.

While our research indicated that IT enabled professionals to connect to more professional links, it would be helpful for future research to trace the longer-term impact of such links on the competencies and mobility of HR professionals. Little is known about the extent to which professionals utilize the opportunities offered by IT via the Internet. Contextual factors, such as the nature of the IT interface, encouragement of supervisors, and organizational emphasis on career development factors, may also be factors influencing the ultimate impact of IT on professional careers. In addition to these suggestions, future research could supplement our study results by addressing whether these measured effects make the HR professional in the HR unit more effective: do these role changes impact work outcomes in a positive (or negative) way.

Our study does have limitations worth noting. Our findings are based on perceptual measures, although some variables, such as gender and age, were factual in nature. The IT index, of course, was completed by HR executives, rather than by the HR professionals. For another, this study was cross-sectional in nature. Thus, to help confirm these findings and further elucidate the impact of IT use on professional jobs, a longitudinal approach is warranted.

Despite these limitations, the results of this study provide important support for the theoretical framework suggested by Zuboff (1988) and demonstrate its usefulness in assessing the impact of IT on the job role of the professional worker. More specifically, our findings suggest that IT can lead to profound changes in the nature of professional work through such mechanisms as reducing routine work while also allowing greater information responsiveness to clients and affording greater autonomy with respect to information handling. Such “informating” provides the underpinnings for IT’s further transformational impact, which impacts HR professionals’ development of new innovative practices and delivery methods. For instance, the HR professionals in our study were already connecting to more external professional links as a result of greater use of IT, enabling greater exposure to innovative ideas. The fact that they were also spending more time on IT support activities suggests that they are acquiring an increased capacity to develop additional IT-based HR applications, thereby potentially furthering the transformational impact predicted by Zuboff’s theory. Thus, our findings have important implications not only for theory, but for practice as well.

References


The Economist. Staff writer (October 26, 1996). Turning digits into dollars, 3–22.


