From Traditional to Virtual HR

Is the Transition Occurring in Local Government?

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This study examines the use of information technology (IT) in human resource management (HRM) and how it affects HRM work. Based on a survey of cities with populations larger than 50,000, it finds that although managers agree that IT is important, relatively few cities use IT in their HRM in any extensive way. Payroll and benefits administration and online recruiting are widely used; however, IT applications in training, job analysis and evaluation, position classification, personnel testing, and background checks are not. The factor that most explains the use of IT in HRM is the technology orientation of HRM managers, and those HRM managers who view IT as a source of competitive advantage are more likely to promote it. The article concludes with implications for careers in HRM.

The American workplace is undergoing profound changes as a result of technological innovation and the emergence of new organizational forms that affect where and how people work (Alcorn, 1997; Bleecker, 1994; Dambra & Potter, 1999; Davidow & Malone, 1992; Palmer & Speier, 1997; Phusitasai, 1998b, 1998c). One area in which this occurs is human resource management (HRM). New technology, such as computer-based job analysis or personnel testing, affects how HRM conducts its internal work. It also provides new roles and opportunities for HRM, helping other departments to embrace technology in HRM and development matters such as employee recruitment and training. For example, computer-based employee training is available but expensive and may require HRM involvement to ensure economies of scale in jurisdictions. Similarly, Web-based recruiting requires HRM involvement relating to legal and processing matters.

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This article examines whether, to what extent, and how the HRM functions in local governments are embracing new information technology (IT). The readiness of local officials, especially those with HR responsibilities, to embrace the necessary changes accompanying new IT is uncertain. This article explores the use of new information technologies in HRM as well as the extent to which cities are "going virtual" in their training and recruitment functions. It also considers the driving forces that spur cities to adopt virtual HR practices, the role of cyber law, and the ways technology affects HRM. A national survey of city managers was conducted in municipalities with more than 50,000 people, and this was complemented by in-depth field interviews.

In recent years, the term *virtual workplace* has gained currency to describe how IT is used to create networks of people interacting in new ways bound by neither time nor space (Crandall & Wallace, 1997, 1999; Yager, 1999). In this article, the term *virtual HR* refers to the use of electronic media in HRM functions. Many of these applications increase the level of information available to HRM professionals and allow them to conduct their work in more productive ways.

FRAMEWORK

How does traditional HR differ from virtual HR? Virtual HR affects both the nature of HR work and how that work is done. A virtual HR environment would be moving to become paperless; relying on electronic interactions; posting jobs on intranets or the World Wide Web; using electronic databases; and making regular efforts to capture, store, and catalogue knowledge digitally for electronic browsing (Elliott & Tevavichulada, 1999; Greengard, 1995; Jones, 1998). Virtual HR will be faster to acquire and respond to information and will use new electronic means for acquiring information, for example, information regarding regulations that affect its work. More traditional environments, by contrast, will involve paper-intensive activities where people and office skills dominate and information is moved more slowly. The virtual HR emphasis also assumes IT leadership both in its own functions and in other areas of the organization affecting HRM. In these areas, HRM can fulfill a consultative/advisory/advocacy role in IT, supporting or requesting cutting-edge technologies in, for example, training and recruitment.

The advent of online recruiting and virtual training has changed the way many organizations manage HR (McCormick, 1997, 1998; Radosevich,

1998; Stowers, 2000). Online job posting provides a fast and easily accessible approach to recruitment that can buttress more conventional approaches of announcing job openings (bulletin board, newspaper, trade press) ("Internet Recruiting Poll Results," 1999). Although some cities may prefer using executive recruiters for posting higher level job openings (Radosevich, 1998), online approaches can be used to broaden the pool and speed up the selection process as well (American Society for Training and Development [ASTD], 1999a, 1999b; Byerly, 1999; Lavigna, 1996; Noran, 1999; Phusitasai, 1998a; Propsner, 1999; Richtel, 2000). Virtual training programs offer another set of possibilities (Bassi, Cheney, & Van Buren, 1997; Loftin & Kenney, 1999; Raphael, 1999). It is now feasible to design user-friendly training technology, to plan training so that learners can go directly to training sections they want to master (using hyperlinks), to accommodate the learning styles of different trainees within a technology-assisted training program, and to make virtual training experiences interactive and engaging (Greengard, 1995, 1998; Stowers, 2000; Vangelova, 1997a, 1997b).

An interesting consequence of the increased IT is the emergence of new cyber laws that affect its use. Before managers jump on the bandwagon of technologically sophisticated approaches to HR functions, policies, procedures, and practices must be established that are legally defensible and managerially convenient. For example, cities need to be sure that sensitive databases and online files remain confidential (Bruno, 1999, Radosevich, 1998). Avoiding Web sites that are misleading or fraudulent in their claims to employees is imperative, as is the need for secure computer equipment so acts of vandalism can be avoided. Established mechanisms for processing complaints about unauthorized or offensive online conduct by employees are needed. Unauthorized copyrighted material should not be put on city systems; employees need to be informed of this. In short, IT policies need to guide HR efforts as cities use more virtual applications.

The extent to which cities are going virtual in the ways discussed above is also likely to be influenced by specific local conditions and managerial interest or actions. Given the importance of leadership, the interest and expertise of such critical actors as elected mayors and councilpersons or appointed city managers, department heads, or chief information officers (CIOs) might provide the driving force. In addition to leadership considerations, various needs, pressures, and demands may spur municipal movement to virtual applications. For example, actions could be prompted by pressures to reduce costs, demands to improve services, or needs to satisfy

customers. The latter might include needs to communicate with employees, to be more responsive to job applicants, or to improve transaction accuracy with line managers. Another driving force is the expectation of stakeholders regarding electronic transactions. These and other municipal conditions regarding IT are considered.

Finally, the use of IT in HRM also affects the requirements for HR work and its nature. Although technology enables offices to perform more tasks with greater precision and accuracy, it also changes the way work is done. HR managers will need to match their "people skills" with those involving technology as e-mail, the Internet, and computer databases become more prevalent. Although this does not diminish the need for people skills, new HR managers increasingly need to be familiar with modern technology so they can begin their job fully prepared for the challenges ahead. They also need to become familiar with the latest software applications in their areas. Midcareer managers need to be technologically savvy to avoid skill deficiencies and cope with current problems.[1]

Another way IT affects the job of HR managers is the degree to which they are comfortable working in a virtual environment. They are less likely to have face-to-face contact, and they are more able to work from remote locations. Although efficiency and effectiveness may increase, managers may be concerned about the alienating impacts of technology and the growing impersonality of workplace relations that they experience. They need to become aware of privacy and confidentiality concerns linked to the use of new technology and potential drawbacks and inappropriate uses of e-mail, databases, and the Internet. They also must adjust to the social isolation that may come from decreased human contact in the electronic workplace (Markoff, 2000). In other words, technology is a double-edged sword that creates problems as well as solves them for HR managers. Interviews explore these sentiments of senior municipal managers.

METHOD

Data were derived from both a national survey and in-depth interviews. The mail survey (also available in electronic form) focused on the use of IT in HRM. It was mailed between December 1999 and March 2000 to city managers and chief administrative officers (CAOs) in all 544 cities with populations larger than 50,000. Responses were received from 222 for a response rate of 40.8%.[2] Respondents were typically either the addressee or the HR director (62.6%); most of the other respondents were direct subor-

dinates (e.g., deputy or assistant city manager, chief of staff, employee relations director). The term *senior managers* is used to refer to the sample because of the diversity of positions. Respondents were provided with the definition of a virtual organization and of virtual HR.[3] Pilot surveys and telephone interviews determined that these terms were clear, unambiguous, and easy for respondents to interpret as they completed the survey items. A profile of respondents indicated that 66.0% were male. In terms of age, 33.9% were younger than 45, 47.8% were between 45 and 54, and 18.3% were older than 54. On average, they had worked 17.5 years in local government. Regarding location, 10.6% were in the Northeast, 25.3% in the South, 30.4% in the Midwest, and 33.6% in the West. Seventy percent worked in council-manager cities. Of the cities, 67.3% had populations between 50,000 and 99,999, 23.0% had populations between 100,000 and 250,000, and 9.7% had populations larger than 250,000. We also completed in-depth telephone interviews among those 14 respondents who scored *high* on the virtual HRM applications index. These interviews of extreme cases provided further insights about virtual HRM.

Overall, respondents were aware of IT in their jurisdictions. For example, 91% stated that they were knowledgeable about IT applications in the workplace. As a test for sample bias, we examined whether addressees' (city managers and CAOs) level of awareness of IT differed from other respondents'. However, no significant differences were found regarding the above measures of awareness. We examined other differences, which are discussed subsequently, but our conclusion is that the mix of respondents did not affect the results.

FINDINGS

Use of IT

Virtual applications in HRM. Respondents indicated that most employees in their city had their own office computers (87.6%), Web access (61.3%), and employer-provided e-mail accounts (73.8%). Clearly, communities across the country are "plugging in" to electronic connections.

More specifically, Table 1 shows the extent of the use of nine leading virtual technology applications in HRM. Respondents were asked to identify which of these items affected more than one quarter of their workforce. Here, the level of activity was more modest: A bare majority of respondents

Table 1.   Virtual Technology Applications in Human Resource Management (in percentages)

Leading virtual technology applications in human resource management[a]	
Payroll and benefits management applications	40.1
Online job analysis and job description system	15.1
Performance appraisal software	14.6
Web-based training	14.2
Position classification software	14.2
Computer-based personnel testing	13.8
Training management software	11.8
Job-evaluation software	10.9
Computerized interviews and background checks	10.8
Frequency distribution	
All items	2.4
Eight items	1.4
Seven items	0.5
Six items	0.5
Five items	1.9
Four items	4.3
Three items	11.0
Two items	13.3
One item	19.5
Zero items	45.2

Note: Cronbach's alpha of virtual uses measure = .81. a. Respondents identified which of the human resource management efforts affected more than one quarter of their workforce.

(55%) used one or more of these applications, and the use was limited. Forty-five percent of cities did not use any of these applications for one fourth of their workforce. Among cities that did use the applications, 80.0% used between one and three, 12.3% used four or five, 1.8% used six or seven, and 6.9% used eight or nine. At best, there was a limited to moderate use of virtual applications in HRM that involved a substantial segment of the municipal workforce. Payroll and benefits management applications were the most widely used and were found in 4 in 10 cities. Training, performance appraisal, and job classification were other areas in which cities used software and online applications: Web-based training and training management software were used in 14.2% and 11.8%, respectively, of cities; performance appraisal software was found in 14.6%; and online job analysis and job description systems and position classification software were used in 15.1%. Job evaluation software and computerized interviews and background checks were the least frequently used applications.

Interviews verified the uses of IT primarily in the areas of budgeting and financial management, payroll/benefits, recruitment, training, position classification, records management, and contracting. In the area of contracting, interviewees said that automation made it cheaper and easier to put out work for bids, easier for bidders to access the system, and easier for the city to quickly search for the lowest bidders. Software helped in classifying new positions by grading them after comparing them with existing positions. Electronic job posting and applicant-tracking and resume-sorting software helped in recruitment, screening, and selection. Available software enabled HR professionals to enter applicants online; and in the event these applicants were subsequently employed, it added those items that make up a personnel file (resume, benefit package, payroll, and ADA/AA information) to existing background information. These bits of information could then be sorted electronically in various ways, and the resulting database allowed HR representatives to respond immediately to employee questions (e.g., inquiries about entitlements). Payroll software was especially useful for temporary workers (who frequently experience wage/salary changes); pay rates could be easily updated. Training software, online training, and electronic imaging of records were also mentioned. Although many respondents were positive about their experiences with IT, not all experiences were favorable. As discussed later in this article, IT has made HRM easier in some ways and more difficult in others. Figure 1 lists selected examples of HR software currently available.

Recruitment. Recruitment is one of several important HR functions: Online recruitment in some form was used in more than two thirds of cities. Table 2 shows the awareness, actions, and preferences of municipal managers in recruitment. Awareness was high: Of respondents, 73.1% understood the strategy of online recruitment.[4] Action was also evident, with nearly 80% of responding managers encouraging their city to use a home page on the Web for recruiting and personally placing electronically searchable job listings on the Internet. Preferences indicated that respondents were selective in their approach to online recruitment. An overwhelming majority (79.1%) preferred receiving student applications via the Internet (thereby minimizing travel time for college campus interviews); far fewer (35.8%) preferred posting jobs for specialty hires on the Web as opposed to placing job ads in hardcopy publications. Less than half favored sorting and distributing resumes from job applicants by hand rather than using resume-management software.

Computer-managed keyboard training	Performance appraisal software
Compensation and management tools	Psychological testing system
Benefit administration	High-performer profiles
Policies, forms, and sample documents	Personality profiles
Prepackaged human resources (HR) internal Web site	HR planning
	Career development
Integrated HR, benefits, and payroll systems	Training administration
	Succession planning
Automated polling	Automated applicant screening
Government forms filing	Leadership development
Equal Employment Opportunity (EEO) and affirmative action plan reports	Customer satisfaction surveys
	Employee opinion surveys
Statistical job group analysis	Injury reports
Applicant flow logs	Resume processing
Adverse impact	Job descriptions
Tools to satisfy requirements of the Equal Opportunity Employment Commission (EEOC), Americans With Disabilities Act (ADA), Free Family Leave Act (FMLA), Occupational Safety and Health Administration (OSHA), Office of Federal Contract Compliance Programs (OFCCP)	Organizational charting
	Contract management
	Work scheduling
	Labor relations
	Workflow automation
	Personal computer–based testing
	Interview scheduling
	Telecommuting costs/benefits
	Team-building software
Census data	Twenty-four hour a day online applications
Employee self-service	
Time and attendance	Learning needs questionnaire
Application outsourcing	Career competency evaluations
Outsourced payroll and tax filing	
Electronic background checks	

Figure 1.   Selected Examples of Available Human Resource Software
Source: Compiled from data found on the Society for Human Resource Management Web site: www.shrm.org/buyers/hris.htm.

Interviews reveal the basis for some of these preferences. For example, one manager from Tennessee stated, "If somebody sends you a resume it indicates to me a higher level of interest." A California administrator agreed but saw efficiencies in automation: "I like to touch the resumes and read them myself; however, I can see how software could speed up the process." A manager from Colorado said, "We have never used resume-sorting software, but I think it would be great. Hand sorting of resumes is the only way we do it, but it is not the best way." This manager went on to explain that insufficient staff made it hard for them to monitor every position and use a

Table 2.   Virtual Human Resource Management Applications in Recruitment and Training (in percentages)

	Agree or Strongly Agree[a]
Online recruiting ("Do you use online recruitment?")	
Yes = 69.8. Of those who said yes . . .	
I have encouraged my city to use a home page on the Web for recruiting	79.6
I prefer to receive student applications over the Internet than to travel to college campuses to initially interview student candidates	79.1
I have put job listings on the Internet so that they are electronically searchable	77.2
I understand the strategy of online recruiting	73.1
It is easier to post higher level jobs online than to use executive recruiters	64.4
I prefer to quickly sort and distribute job applicant resumes by hand rather than using resume management software for this task	45.2
I prefer to post a job for specialty hires (e.g., software developers) on the Web rather than listing the job ad in a help wanted section of a publication	35.8
I have conducted online research (e.g., monitoring online newsgroups and publications) to identify job candidates for specialty positions	20.2
	Yes[b]
Virtual training ("Do you use computer- or Internet-based training?")	
Yes = 40.8. Of those who said yes . . .	
We choose media types/formats that aid in meeting our training objectives	82.1
We seek to make our virtual training experience as interactive as possible	79.8
We always make sure our training technology is user friendly	79.2
Training systems are designed to accommodate employee learning styles	61.4
A wide variety of strategies/exercises are used in our computer-based training	48.6
Virtual training applications are evaluated to determine impact on productivity	40.0
Training content is supplemented with hyperlinks to related Web pages	21.8
Training is designed with hyperlinks so learners can focus on interests	13.2

Note: Cronbach's alpha of virtual training = .79.
a. Responses were given on a 5-point Likert scale: 5 = *strongly agree*, 4 = *agree*, 3 = *don't know or can't say*, 2 = *disagree*, 1 = *strongly disagree*.
b. Scale: 2 = yes, 1 = no. Percentage "yes" shown.

tailored approach. "If we had someone working in an IT position we would be more apt to use this new technology." A Texas executive, whose city did not use a software package in recruitment, said, "we would like to move in that direction." There was limited use of resume-sorting or applicant-tracking software, most cities still hand-sorted resumes, and there was little use of imaging or scanning. Managers who used applicant-tracking software said it was helpful in distinguishing qualified from unqualified applicants and in collecting demographic information for affirmative action purposes. A manager from Florida said that his city listed hard-to-fill jobs and technical positions (engineer, planner) on the government Web site and positions at all levels on the city Web site (along with applications).

Passive approaches to electronic recruitment (receiving student resumes) seemed to be preferred over more active approaches (monitoring online newsgroups and publications). Recruitment for specialty or higher level positions was less frequently done online. For example, although a majority of managers (64.4%) believed it easier to post higher level jobs online than to use executive recruiters, less than one fourth of respondents had engaged in online research to identify job candidates for specialty positions. Interviews help explain some reasons for these tailored approaches to filling different kinds of jobs. For example, one manager from a western city observed, "Electronic recruitment and automated screening is good to use for entry-level positions . . . [but] professional recruiters sometimes have a better handle on who the good candidates are." Screening for upper level positions was usually more complex and had multiple hurdles, including various tests and interviews. In general, the use of different strategies depended on the market: low paying jobs were filled from the local market; higher paying jobs were filled through recruiters. One HR manager from a southern state said his city did recruit high-level job candidates electronically, but he acknowledged that "there is something special about putting your eyes and hands on a resume."

For many cities, low unemployment rates made recruiting a challenge. Results from interviews suggest that, aside from job posting and occasional use of resume sorting and applicant tracking, many cities were not using cutting-edge technology in this area. Respondents acknowledged, however, that use of IT in recruitment would increase in the future.

Training. Training is another essential HR function: Computer- or Internet-based training was used less frequently than online recruitment. Four out of 10 respondents used electronic training. Those cities that used computers or the Internet to train employees and managers made special

efforts to capture the attention of the trainees. For example, 8 out of 10 respondents said that they selected media types and formats that helped to meet training objectives and employed training technology that was user friendly. The same proportion made their virtual training experience interactive, for example, using interactive technologies (video, television, cable) to enrich distance education. About half of respondents offered a full range or wide variety of strategies and exercises in their computer-based training; 6 out of 10 customized their training systems to accommodate employee learning styles.

More could be done to measure the results of online training: Forty percent of the responding cities documented the link between virtual training applications and productivity improvements via evaluation. One in five or fewer used hyperlinks to augment training content found on Web pages or to allow learners to focus more specifically on their interests.

In short, cities are making limited use of electronic training and designing approaches to engage the attention of trainees, but they are not capitalizing on the vast potential of available online and computer-based training applications or tailoring these to the particular needs and interests of trainees. This underutilization of the full capabilities and potential of electronic transactions is consistent with other surveys of city government (e.g., Martin, 1997). Fire departments are one place where online training is making a difference. Interviews with a management information systems (MIS) manager in a medium-sized Texas city, for example, indicate that Emergency Medical Services use Internet sites extensively in training firemen.

Explaining the Use of New Technology in HRM

Technology orientation of HR managers. Apart from questions regarding the use of virtual HRM applications generally and the specific use of electronic approaches in recruitment and training, there are questions concerning the orientation of HR professionals to the use of virtual applications in their field. Data reported in Table 3 tap managers' attitudes regarding sentiments, abilities, and actions of HR in reference to IT (alpha = .84) and report the association of these items with the index measure of items shown in Table 1 (alpha = .81). About three fourths of respondents strongly agreed or agreed that HR supports the use of cutting-edge IT, with almost half agreeing that HR requests such leading technologies from their IT group.

The types of technologies supported and requested, as described in interviews, include payroll reports, customer reports, automated contracts,

Table 3.   Factors Affecting the Use of Virtual Technology in HRM–I

	Agree or Strongly Agree (%)[a]	Associated With Virtual HRM (Tau-c)[b]
Technology Orientation of HRM		
HR supports the use of cutting-edge information technology	75.2	
HR sees IT as a way to achieve competitive advantage	56.1	.122*
HR professionals request cutting-edge technologies from IT group	48.9	.145**
HR staff has information-management and technology skills	41.9	.198**
HR plays a leadership role in information technology	34.1	.149**
HR uses intranets and groupware to obtain information	25.1	.191**
HR captures, stores knowledge for electronic browsing	17.7	
HR has a paperless office environment	6.1	
Mean	38.1	.185**

	Yes (%)[c]	Associated With Virtual HRM (Tau-c)[b]
Cyber laws		
Procedures protect confidentiality of computer databases and online files	90.6	
All publications on our Web site are reviewed to ensure that they are not misleading or fraudulent in their claims	87.1	
Employees are told not to put unauthorized copyrighted material on the city Web site	86.4	.139**
A procedure exists for handling complaints about unauthorized or offensive online conduct by employees	79.6	.279**
A legally sound e-mail policy exists	77.1	
Mean	84.2	n.s.

Note: HRM = human resource management. Cronbach's alpha of technology orientation measure = .84. Cronbach's alpha of cyber laws = .79.
a. Responses were given on a 5-point Likert scale: 5 = *strongly agree*, 4 = *agree*, 3 = *don't know or can't say*, 2 = *disagree*, 1 = *strongly disagree*.
b. Index measure of items shown in Table 1.
c. Scale: 2 = yes, 1 = no.
*$p < .05$. **$p < .01$.

online budgets, applicant tracking, automated forms and procedures, online meeting agendas, automated screening, Internet, e-mail, voice mail, electronic data interchange, intranet, and local area networks. Most respondents saw IT as a way to achieve a competitive advantage. Interviews reveal

that by *competitive advantage*, respondents meant enhanced ability to exchange information electronically to improve relations with key stakeholders (e.g., job applicants, citizens, suppliers, contractors, department heads, employees, neighboring jurisdictions, other HR managers). As one manager observed, "IT gives us a competitive advantage in HR—a better handle on what we are doing for and with our people." More specifically, a Texas managers noted, "No one wants to work in an antiquated work environment and IT helps to keep employees happy. For example, they can work from home or in satellite offices." This competitive advantage was especially evident in recruitment where more than one manager expressed the same sentiment: "It allows us to compete with the private sector in attracting and retaining good employees."

In terms of the role and skills of staff, 4 in 10 respondents claimed the HR staff possessed information management and technology skills, and about one-third (34.1%) stated that HR plays a leadership role in IT. This finding suggests that opportunities exist for HR professionals to capitalize on their skills to assume a more aggressive leadership role in the IT area. Currently, HR staffs are not assuming the role of IT "local heroes" that Borins (1998) said is necessary for IT innovation. HR professionals may be deferring leadership to CIOs who have specific IT responsibilities in many cities (Gurwitt, 1996). Interviews indicate one fruitful area where the potential for more aggressive HR leadership could be realized: bridging the gap between knowing what is useful and actually using it. As one Texas manager said, "We need to be more aggressive in using on-line training. We know it is valuable, but the word is not getting out. We need to train the managers to get the information to the employees." A different Texas manager favored complementary roles for HR and IT: "HR is composed of information gurus and the IT department is where the leadership should come from. HR should use IT to deploy information." Survey results indicate that those in HR were less likely (25.1%) to use intranets and groupware to obtain information or to capture and store knowledge for electronic browsing. Despite this generally supportive, if muted, orientation of HR toward IT, it is clear that the goal of achieving a paperless office environment is far from a reality in local government.

Table 3 also shows a significant ($p < .01$) association between technology orientation and use of virtual applications. Examination of specific orientation items and their associations with the virtual HRM index show significant relationships exist between the virtual index and respondent reports that HR has information management skills, plays a leadership role, uses

intranets and groupware to gain information, and requests cutting-edge technologies for the IT group ($p < .01$). It is not surprising that where HR has the ability, leadership, and willingness, to request and use new information technologies, cities are more likely to be using virtual HRM applications for a substantial portion of their workforce.

Resolving cyber-law issues. Cyber-law issues gain salience as cities gravitate to a digitized work environment. Table 3 shows that almost 8 out of 10 respondents claimed to have a legally sound e-mail policy in their city. In many, policies and procedures spelling out dos and don'ts have evolved. For example, procedures exist for handling complaints about online conduct by employees (unauthorized users, offensive language), protections are in place to protect the confidentiality of computer databases and online files, and employees are cautioned not to put unauthorized copyrighted material on the city Web site. Regular review of all publications on municipal Web sites is done in most cities (87.1%) to ensure that messages are not misleading or fraudulent in their claims.

Interviews provide concrete examples of some of the most prevalent policies and procedures and how they are implemented. Specifically, municipalities in Texas, Utah, Florida, Colorado, California, and Tennessee have policies encompassing proper and improper use of the Internet and the penalties for those who misuse it. Typically, such policies include "a multitude of sins" and controls regarding time spent on the Web, specifics about which sites can be visited, and filters in place to eliminate or detect pornography and hate mail. Some cities lack policies dealing exclusively with the Internet but have more general policies that include Internet and e-mail abuses as well as misuses of other forms of communication (e.g., prohibitions on use of city phones for 900 numbers). Other cities have policies under development. According to observations obtained from managers in mid-sized cities in Texas and California, the review of messages for fraudulent or misleading claims is done by outside consultants, MIS managers, and/or deputy/assistant city managers. Some cities conduct internal spot checks; others do not regularly review such messages.

The five cyber-law items listed in Table 3 can be combined into an index (alpha = .79), but it is not positively associated with the virtual HRM index. However, the association with single items is significant for complaint-handling procedures about offensive online conduct and instructing employees not to put unauthorized copyrighted material on the city's Web site ($p < .01$). As the municipal workplace becomes more connected electronically, the need also increases for policies and procedures to meet legal and ethical

Table 4.   Factors Affecting the Use of Virtual Technology in HRM–II

	Agree or Strongly Agree (%)[a]	Associated With Virtual HRM (Tau-c)[b]
General management and productivity orientation		
"In our jurisdiction, employees and managers . . . "		
are committed to providing customer service	94.4	.126**
are driven by a sense of accomplishment	78.9	.094*
are highly motivated to achieve their goals	70.4	.117*
are empowered to make important decisions	68.2	.093*
are committed to being accountable	66.8	
are committed to seeking and using feedback	60.6	
Mean	87.9	.105*

	Yes (%)[c]	Associated With Virtual HRM (Tau-c)[b]
Technology orientation of managers and elected officials		
Department heads are interested in information technology	97.6	
The city manager is interested in information technology	96.7	
Councilpersons are interested in information technology	91.5	
Mayor is interested in information technology	85.1	
Stakeholders expect electronic interaction	77.8	
A chief information officer exists	74.8	
Mean	87.3	n.s.

Note: HRM = human resource management. Cronbach's alpha of general management and productivity orientation = .82. Cronbach's alpha of technology orientation = .46.
a. Responses were given on a 5-point Likert scale: 5 = *strongly agree*, 4 = *agree*, 3 = *don't know or can't say*, 2 = *disagree*, 1 = *strongly disagree*.
b. Index measure of items shown in Table 1.
c. Scale: 2 = yes, 1 = no.
*$p < .05$. **$p < .01$.

standards. However, the presence of these policies does not correlate with the applications in such specific areas, including HRM.

General, organization-wide productivity and technology orientations. The technology and productivity orientations of general management and of people occupying specific elected or appointed positions are among the factors that might affect the use of virtual technology in HRM. Table 4 reports perceptions of general managers regarding productivity in their city. As characterized by these high-level managers, the commitment to customer service is pervasive (94.4%), as is the driving force, "sense of accomplish-

ment" (78.9%). Seven of 10 respondents stated that their employees and managers are highly motivated, goal oriented, empowered to make important decisions, and committed to be held accountable for them. Fewer, but a substantial majority, are dedicated to continuous improvement by seeking and using feedback. When combined into an index (alpha = .82), these six items are significantly associated with the index of virtual HRM applications ($p < .05$). Item-by-item associations with the virtual HRM index show significant correlation ($p < .01$) for commitment to providing customer service, motivation to achieve goals, being empowered to make important decisions, and being driven by accomplishment ($p < .05$). Clearly, the movement to virtual HRM, albeit a slow one, does appear to be linked to productivity indicators.

Focusing more specifically on the technology orientation of particular managers and elected officials (Table 4), city managers and department heads are overwhelmingly interested in IT (both in excess of 95%). Support drops off slightly for elected officials, with both mayors and councilpersons showing substantial interest: 85.7% and 91.5%, respectively. The emergence of a CIO at the local level, a person with an obvious interest in IT, is apparent, with nearly three fourths of respondents indicating that such a person exists in their city. Other stakeholder expectations for electronic transactions are found to exist in more than three fourths of cities. None of the individual items are significantly correlated with the virtual HRM index. These items do not combine well into an index variable, and any such index is not correlated with the virtual HRM index. Again, the breadth of support among managers and elected officials may, in part, explain the lack of significance. Yet, the presence of a CIO, where variation is greater (74.8%), lacks a significant association with the use of virtual HRM applications as well.

Explaining variations in the virtual HRM index and productivity indicators is complicated. The results of multiple regression models involving the above independent variables report low adjusted R^2s and therefore are not reported here. However, a key reason for the poor performance of regression models in this instance is that few cities are, in fact, high users of virtual HRM applications. As shown previously in Table 1, only 6.7% of respondents use more than half of the applications shown, and almost half of the respondents (45.2%) use none. One insight is that when cities are classified as *low* and *high* in the use of virtual HRM applications, respondents from *high*-classification cities were more likely to have HR staff with strategic management skills ($p < .01$).[5] This may suggest that the role of staff, and the

preferences of HR managers for the use of IT, are key drivers of decisions to invest in these technologies, rather than any "structural" considerations such as the presence of budget shortfalls, interest among elected officials, the presence of legal policies, and so on. Information derived from interviews, reported below, support this view and further helps to clarify the ways in which technology influences HRM.

How Technology Affects HRM

Technology affecting the nature of HRM work. Overall, has IT added or detracted from the amount of HRM work? In what ways? Interviews among respondents provide a mixed assessment of this impact. Some managers felt their work was made easier; others said it was harder. One respondent reflected both views: "Life is easier as a result of IT. Work is more difficult because of the explosion of requests for information. E-mail has made communicating easier though." Ways it was made easier include allowing greater access to information, gaining useful feedback, conserving time, improving data gathering and analysis, reducing reliance on paper forms and clerical staff, expanding managers' capacity to visualize and model solutions to problems, enabling quicker and better decision making, and improving communication throughout the hierarchy and with a wider range of stakeholders. Typical comments in this regard are, "I feel I have better access of information which allows me to make decisions instead of spending time on research"; "I am excited about what it can do for us—so many processes that can expedite things and help in gathering and sorting data"; "I can set up meetings without making a phone call." Examples of applications that made work easier are automated applicant tracking and screening (selection), job posting (Internet), contract bidding, position classifying, and training software. One manager contemplating firing an underperforming employee sent numerous e-mails to build an electronic trail documenting instances of poor performance; this was viewed as an easier and better form of documentation than the traditional paper trail.

Work is made more difficult in an electronic environment because of more requests for information and technical assistance, skill deficiencies among staff, increased requirements for training, heightened potential for misuse of information, compromised confidentiality, decreased privacy, and reduced face-to-face interactions. As a manager from Colorado opined, "IT has not made work easier. It allows us to be more productive, but it has not replaced any work. It helps us do more; adds more work." Ironically, e-

mail was used by managers as an example of how IT cuts both ways—making work at once both easier and more difficult. "E-mail has made communication much easier," was a common observation, as was "I get bogged down with too many e-mail messages." The increased efficiency, timeliness, and responsiveness resulting from IT was noted, but the increased workload was also stressed: "I did not realize how labor intensive the web-site would become." A manager from the Midwest favored use of new technology, but he said IT added substantially to the volume of work and highlighted skill deficits of staff: "IT made me a lot busier. I get a lot more requests for assistance from people who are less technically inclined." Others felt they were "losing touch with employees."

Managers were asked whether there was a downside to virtual HRM. Responses indicate that the key to avoiding the downside is to use technology properly: "As long as technology is used properly there really is no downside." One city official indicated that an automatic screening tool was used as part of the selection process, but by doing so, "they missed some excellent candidates." But interviewees cautioned that the downside can be avoided "as long as the people in HR don't stay isolated" and "as long as we don't become too reliant on technology." A manager from Texas stressed that he makes it a point to "stress to staff to talk personally and not through e-mail on important issues." Persistent use of e-mail, a Florida manager observed, may "decrease accessibility of managers and inhibit employees from bringing up issues." Echoing these comments, an interviewee from a Rocky Mountain city emphasized that "the human part of the job is paramount." Clearly, the personal touch is still needed in a high-tech environment.

Technology affecting the HRM workplace. Views were split on whether IT had made the workplace more impersonal: Most indicated that, because of IT, employees actually have "more time to interact face-to-face." One manager said IT has not made his work more impersonal: "We wouldn't allow that to happen." Another said, "An area that shouldn't be impersonal is HR. It needs to be personal." A third observed, "Dehumanizing work is a risk. The human part of HR is very important." One manager from California felt that personal contact had diminished with the advent of IT and cited a tendency to "rely on data instead of reality." He criticized electronic communication for creating too much irrelevant information, increasing social isolation, and resulting in a general lack of personal communication. More than one interviewee alluded to a mixed picture with some resistance to IT at all levels. Interviewees were divided in their opinions on whether

they felt more or less connected to employees and managers in the organiza-
tion with the advent of IT. Most said they felt more connected: "We are
more connected because it is easier to communicate with thousands of
employees"; "We are more connected because of more and quicker commu-
nication"; "We are more connected to other organizations because of shared
information." In general, most respondents felt that IT "adds value, does
not detract" in the HRM workplace. As one manager observed, "I have the
ability to do more things independently without support staff." Another
interviewee expressed his positive view as a formula: "HRM + IT =
improved HRM: better/faster."

Do IT changes affect relations with colleagues? No. Most of those inter-
viewed felt more connected to their colleagues in HR in an electronic envi-
ronment, in which, despite spending more time online and responding to
e-mails, face-to-face communication is still imperative. However, some cit-
ies experienced bumps in the road on the way to electronic HR:

> Using IT has caused a shift in the communication between those who are
> computer literate and those who are not. As more people have become more
> computer literate, relationships are getting closer again and communication
> has improved by virtue of the Internet.

Sometimes the HR managers' enthusiasm for IT is dimly reflected among
their colleagues: "I had to do a lot of work to introduce the managers and
staff to the wonders of IT. Once they learned it, they began to use it. How-
ever, they are not as enthusiastic as I am." In this instance, lower level
employees were more excited about IT than mid-level and upper level man-
agers. Some higher level managers give IT top priority and alluded to its
importance for their work; typical of this is the following comment from a
Texas manager:

> Whenever things in the organization go wrong and need fixing, it is the
> absolute top priority to fix IT first because it affects so many people and so
> many things. IT has made my staff and me very visible to everyone, so
> employees come directly to us for help.

Managers felt more connected to HR professionals in other organiza-
tions as a result of IT innovations. Although most maintained contacts
principally via professional conferences, electronic communications (e-
mail, intranet, Internet) facilitated interjurisdictional interactions. A man-
ager from a western state makes effective use of an e-mail message board
with his counterparts in other cities. He said, "I am definitely better con-

nected to colleagues in other organizations using IT; it opens up another line of communication, and web-links make it easier to exchange ideas and policies."

Technology affecting careers in HRM. When asked whether IT was seen as an opportunity or a threat to their career, all but one respondent indicated that it was an opportunity. The lone dissenter was actually neutral, observing that because he was nearing retirement, he doubted it affected his career chances one way or the other. One recurring opportunity that was cited was the increased ability to improve individual and organizational performance and the related career benefits. IT helped to provide "quick access to information that aided in completing projects" and the enhanced ability to "share knowledge" and "get new ideas" from those in other cities. An interviewee from Nebraska said employees derive career benefits: "They can see the benefits of learning the technology to advance themselves." Respondents from the West and South agree: "I have been able to move up in the organization more quickly because of IT skills"; "Personally, I have good IT skills that are in demand in the job market."

Interviews explored the skills that future HR managers would need and whether existing job candidates have any crucial skill deficits. A recurrent theme was expressed by a senior manager from Oregon: "Future managers must have a firm grasp of technology and how it affects the organization." Communication and interpersonal skills were also stressed. A senior manager from a southern state went beyond these skills to distinguish between micro and macro skills: "Good administrative skills, leadership skills, facilitating skills, an appreciation for doing things right (micro). The ability to guide an organization to do the right things (macro)." Although both are important, this manager lamented that "few candidates have both micro and macro perspectives." A southern manager made the distinction between HR generalists and specialists (compensation, labor-management relations), arguing the need for more generalists in the future. These observations are instructive to educators who are training their graduates for careers in the public service; micro and macro skills should both receive emphasis in graduate training programs.

Respondents repeatedly stressed the need for a "combination of people skills and technical skills" but observed that such combinations are "hard to find," especially when "low salaries result in a poor candidate pool." As one noted, "Skills have not changed that much except a thorough knowledge of the technical aspects is needed; they [employees and managers] still need interpersonal skills and the willingness to use them." Managers recognized

that "better candidates bring a larger set of IT skills to the job," but such candidates have a competitive edge in the job market and are hard to hire, so it is often necessary to have new hires develop IT skills on the job. In this regard, several managers said there is "a lot more training" in a high-tech environment; "employees are constantly going to training" and "IT requires everybody to retool more often." Several interviewees mentioned that despite the increased use of technologies and the need for employees with such skills, good people skills remain critical.

Do new graduates or generation Xers have any advantages here? The academic and popular literature (e.g., Brackey, 2000; Gilles, 2000; Jurkiewicz & Brown, 1999) and our interviews suggested that they do, but there are exceptions as well. For example, a manager from the Midwest observed, "Generation X-ers in general have an advantage when applying for a job. Their skills, for the most part, are better regarding IT. However, this is not true across the board. Some older employees have a much better idea of how IT can help the organization." A manager from the Rocky Mountain West volunteered, "I am comfortable with IT, and I am young (28). . . . The comfort level of Generation Xers helps a lot." Similarly, a southern manager said the continuous upgrades in IT give generation Xers an edge: "GenXers have an advantage because of their familiarity with constantly changing hardware and software." A California manager saw both positives and negatives: "GenXers are more in tune with the needs of IT and HR departments, but they may not have a grasp of the human needs (e.g., conflict resolution) that must be addressed."

SUMMARY AND CONCLUSIONS

This article assesses the extent to which IT is used in HRM, and it investigates the ways IT affects HRM work. Evidence from mail surveys and interviews is cited. Overall, the findings show that despite widespread availability of computer hardware, Internet connections, and HRM software in cities, there are few IT applications with widespread use in HR. The considerable potential of IT to aid HR performance is far from realized in most cities. This is surprising in light of the high level of interest in IT among top elected and appointed officials and the link between virtual HRM and productivity indicators as revealed in our findings. Although most jurisdictions use online recruitment in some form, and awareness of its potential is high, cities seldom use the full range of electronic options available, often preferring to use IT selectively and passively in recruitment. This tendency is even

more pronounced with regard to training; computer- or Internet-based training is used in a minority of cities. Furthermore, those cities that do use electronic training fail to fully exploit its capabilities as a learning tool.

As this study suggests, HR professionals can play a crucial role in the move to a virtual workplace. Senior managers indicate that those in HR are supportive of new information technologies and that many possess IT skills, but in most instances HR is not playing a leadership role in IT. Again, the potential is there, but it is not being realized. The orientation of HR professionals makes a difference: In cities where HR has the skills, demonstrates the leadership, and is willing to request new information technologies, findings show that virtual HR applications are more likely to be used for a substantial portion of the workforce. Although HR leadership in IT has been slow to materialize, our data show that cyber policies and procedures have emerged quickly and diffused widely. Legal requirements undoubtedly help to account for the speed and diffusion of such policies.

As noted in the interviews, IT has an impact on how HR work is performed, on the HRM workplace, and on HRM careers. Some of these results are predictably paradoxical: As a consequence of IT, work is at once made easier and more difficult; the workplace is simultaneously more isolated and more connected; and although workers possessing IT knowledge and skill can experience career enhancement, those with skill deficits in IT can experience career impediments. Electronic connections will not replace person-to-person interactions, but they can augment them. Ideally, the HR professional will have a blend of technical skills, including IT sophistication, and interpersonal skills.

The Internet enables quicker and easier communication with people inside and outside the city jurisdiction. External electronic interactions are increasingly important because many HR problems (e.g., market salary surveys, specialized training programs, joint purchasing of expensive software, securing bids from area contractors) may be best resolved or coordinated at a multijurisdictional level rather than a single-jurisdiction one. Within the city itself, interviewees stressed that intranets and e-mail facilitate improved communications and transactions for employees, providing direct access to HR managers and quick response to problems as they emerge.

IMPLICATIONS AND RECOMMENDATIONS[6]

In the electronic environment of the present and future, there are opportunities for the HR manager to be a catalyst or change agent. This leader-

ship role involves bringing together three critical elements: people, resources, and technology. *HR professionals should cultivate collaboration and forge a strategic partnership with the CIO or his/her equivalent.* Both the HR manager and the CIO have the responsibility and opportunity to interact with units across the organizational matrix of city government. Technologically competent HR professionals can be a useful bridge between technically sophisticated CIO staff and those politicians, middle managers, and front-line workers who may be technically naive. They can help the organization adapt to the new ways of thinking and acting that are required to take advantage of the capabilities technology has to offer. As noted, the interest in new IT is high among elected officials—mayors and councilpersons—and even higher among top-level appointed officials—city managers and department heads. Translating that interest into action that will electrify transactions is a challenge facing all municipal officials.

To reduce the gap between interest and action, municipal leaders can pursue different strategies depending on their readiness to make the transition from traditional to virtual HR. *Where the gap between interest and action is modest, managers can educate employees to the promise of new IT and then invest in the technology most appropriate to their needs.* Education efforts can emphasize the productivity benefits of new technology. It is clear that many municipal governments have seen the benefits of software programs in financial management and payroll/benefits. Far fewer are using the array of available hardware and software in recruitment, training, and other areas crucial to HRM. Leadership is needed to move from passive to active recruitment using electronic connections and to take advantage of the full range of automated training methods while simultaneously tailoring them to the particular needs of the workforce. *City officials who wish to emphasize IT in HR must recruit, train, and reward staff with IT skills and provide incentives for their leadership efforts.*

As Mechling (1995, 1996) has noted, a different option exists for jurisdictions where leaders may be less inclined to education but where opposition to IT is minimal: *invest in new technology and educate once implementation is under way.* An integrated approach to education and project implementation, although tricky, may be appropriate in such settings. A key challenge for educational efforts is to convince middle managers and employees to accept the new technology. One way to do this is to *involve users in designing, adapting, or refining new IT.* Initial investments might focus on user-friendly technology that is likely to bring quick and visible results to hasten user acceptance. Finally, some cities may not be amenable

to either education or investment strategies at this time, preferring instead to continue relying on traditional HRM processes. In these instances, a "wait and see" posture may be most appropriate. As more generation Xers join the workforce, the driving forces for change will likely provide the impetus for such jurisdictions to go virtual as well.

Enthusiasm for meeting this challenge should not lead HR managers to disregard the possible unintended consequences or problematic aspects of new IT. *Some backward mapping is necessary so that officials will think through the implementation issues that come with the move to new communication technologies.* It is clear that use of new IT, especially in HRM, will not supplant the need for face-to-face contact and the "human touch." It is also clear that the productivity gains associated with IT may require additional work rather than reduce the workload of those performing HR functions. *On the policy side, it is important for managers to carefully design the procedures necessary to ensure proper use of the Internet, e-mail, and other forms of electronic communication.* As our survey indicates, many cities already have such policies in place. Those developing these policies should be mindful of employee privacy and confidentiality rights as well.

Other functions in local government may be plugging in to electronic technology at different rates than is occurring in HR. However, there is some indication that the findings reported here are in sync with those reported elsewhere for other functions. For example, a recent survey of southern California municipalities conducted by Ting and Grant (2000) found "forty percent of employees reported performing routine tasks, such as purchasing and recruiting activities on the Internet." Respondents in their survey alluded to electronic posting of job vacancies as well as the acceptance of resumes and job applications on the Internet. West and Berman (2001) found that a majority of cities were using financial and budgeting software, affecting a significant segment of the workforce. Two thirds of cities in their survey had tested or implemented payroll and benefits applications, a majority had used inventory software, and 4 in 10 cities had a CD-ROM collection of municipal regulations. From these studies, it would appear that the HR function is progressing apace or lagging slightly behind that of other municipal functions in the transition from traditional to e-government. *HR professionals should lead and not lag in applying new technologies, showcasing the contributions of IT to municipal performance.*

Municipal managers should reach out to a younger, more technologically inclined group of potential employees who combine "high touch" with high tech skills. To the extent that there is a generation gap among workers, HR man-

agers are challenged to provide adequate representation of employees on both sides of the age and digital divide. In each case, managers and employees must realize, as Bob Dylan reminded us in the 1960s, that "the times they are a-changin' ": The challenges posed by alternative workplace relations and new information technologies will continue to increase in the 21st century.

NOTES

1. Many graduate public administration programs have recognized this by encouraging students to take courses and develop skills in computer applications and management information systems.

2. Thirteen percent of responses were submitted electronically. A nonrespondents survey was also conducted, but it did not show statistically significant differences with the response analyzed here.

3. *Virtual workplace* was defined as an organization in which employees can work from remote sites by being electronically connected to their employer's communication system. *Virtual HR* was defined as the use of electronic media in human resource management functions.

4. Among all respondents—users and nonusers of online recruitment alike—this number is barely different: 77.9%.

5. The same level of significance of results occurred using four different coding strategies: $low = 0$, $high = 3$ to 5; $low = 0$, $high = 3$ to 9; $low = 0$, $high = 1$ to 9; $low = 1$ to 2, $high = 3$ to 9.

6. Recommendations appear in italics.

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