The Evolution of the Field of Human Resource Information Systems: Co-Evolution of Technology and HR Processes

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Abstract:

In this paper, we review the professional and academic development of the human resource information systems (HRIS) field to assess its progress and suggest ways for moving research forward. To do so, we examine the interplay between the evolution of technology and the HR field through four key eras of technology: 1) mainframe, 2) client server, 3) ERP and Web-based systems, and 4) cloud-based systems. In each era, we discuss how HR practices and requirements drove the need for the use of these systems and how these systems allowed the HR field to evolve. In addition, we trace the HRIS subfield and its relation to the technological evolutions occurring in the HR field. Somewhat surprisingly, we found that much of the research on the use of technology to support HR has occurred only in the last 15-20 years as a response to the use of the Web as a medium for delivering HRIS. We conclude by discussing how scholars from the information systems and human resources fields can come together to help advance HRIS.

Keywords: Human Resource Information Systems, Electronic Human Resource Management, eHRM, HR Technology, HR History, History, Mainframe, Client Server, ERP, Cloud Computing.

1   Introduction

Information systems (IS) have long had a major influence on organizational functioning and overall organizational effectiveness. From the traditional transaction processing systems developed in the 1950s and 1960s to today's cloud-based enterprise-wide systems, organizations have used IS to support all business functions including marketing, accounting, production, and human resources management. As a result of implementing these systems, professional and academic fields such as accounting information systems (AIS) and supply chain management have emerged and transformed the way that accounting is practiced and production and inventory are managed. One of the last functions in organizations to benefit from information systems was human resource management (HRM). But there is now a burgeoning interest in the practice and research surrounding HRM's use of technology.

HRM's goals are to attract, motivate, and retain employees in their roles, but the administrative functions associated with this field have always been cumbersome and labor intensive. The earliest computer-based systems developed for HRM were often used to automate and support payroll and other data-intensive functions (e.g., personnel record keeping). For example, in 1943, the passage of tax legislation required HRM to develop new payroll systems, and GE developed the first in-house mainframe system for payroll to meet these new demands (Fletcher, 2005). Although HRM began using technology in the 1940s, the field has often lagged behind other functional areas including accounting and supply chain management in applying innovative technologies (DeSanctis, 1986). The HRM field did not recognize the importance and benefits of technology until the 1990s (Kavanagh, Gueutal, & Tannenbaum, 1990), and relatively little theory and research has focused on the topic (Gueutal & Stone, 2005).

In the last 20 years, technology has had a dramatic influence on HRM processes and practices, and a new field has emerged, human resource information systems, which focuses on using technology to support the HR function. A HRIS refers to "a system used to acquire, store, manipulate, analyze, retrieve, and distribute information regarding an organization's human resources to support HRM and managerial decisions." (Kavanagh et al., 2015, p. 17). Some researchers have also called this new field electronic human resources management (eHRM) (Lengnick-Hall & Moritz, 2003; Gueutal & Stone, 2005). What started out as a simple mainframe system to automate payroll has now touched all areas of HRM including recruitment, selection, training, and compensation (Stone, Deadrick, Lukaszewski, & Johnson, 2015). Not surprisingly, these systems have greatly improved many HRM sub-functions and enabled the field to enhance efficiency, decrease administrative burdens, and provide improved service to employees, retirees, and job applicants. Furthermore, the advent of the Internet and new cloud-based technologies have helped HRM achieve the critical goals of attracting talented applicants, streamlining selection processes, facilitating the use of self-service technologies, and allowing organizations to deliver training in remote locations.

Recent estimates indicate that nearly all large organizations have adopted human resource information systems to support core functions, processes, and decisions (CedarCrestone, 2014), and smaller organizations are increasingly using HRIS to support HRM functions. Despite this growth in HRIS use, research on the use of HRIS has often been fragmented, and little focus has been given to the field's evolution. We know only of limited research (e.g., Kavanagh et al., 1990; Walker, 1982a) that has traced the link between changes in technology and the application of information systems in HRM. An understanding of the history of a field is important because it directs attention to the continuities and discontinuities associated with the evolutionary process. It also helps HRM managers learn from past mistakes and enables them to identify the reasons that the field lagged behind other functions in adopting technology. In addition, some historians suggest that "the past gives value to the present, and those who do not study history are doomed to repeat it" (Rutherford, 2014). As a result, an understanding of a field's history should provide a foundation for growth and change and accelerate the degree to which HRM uses technology to achieve its primary goals.

Given the increased use of information systems in HRM and its influence on the field, in this paper, we (1) review the history of HRIS through the lens of evolutionary changes in technology, (2) consider how technology has changed the practice of HRM and how practice has modified the use and development of new systems, and (3) discuss the impact of four major technological innovations on changes in HRM processes and practices. In particular, we consider how (1) mainframe computing, (2) client-server computing, (3) Web-based enterprise resource planning systems, and (4) cloud-based software-influenced changes in HRM. For each technological era in history, we discuss the major innovations in the HRM and HRIS fields and the interaction between HRM practice and technological innovation. In addition,

we review some of the research conducted on HRIS and field milestones and present several research questions to guide future research and practice. Note that our review of the literature is not meant to be comprehensive and focuses heavily on U.S.-based practices. Finally, we conclude the paper by discussing how to integrate theory and research in the HRM and IS fields so that the HRIS subfield can continue to grow and evolve. We start in Section 2 by discussing the terms HRIS and eHRM and their use in the field.

2   Difference between HRIS and eHRM

As we note in Section 1, as the IS field has matured, it has become integral to the practice of many functional areas in organizations such as accounting, finance, supply chains, and marketing. As these fields are transformed by technology, one of the biggest challenges faced by researchers is how to define the new field that lies at the intersection of that functional field and information systems (e.g., accounting information systems, HRIS, etc.; Sutton & Arnold, 2002). For a field to emerge as clear and distinct, some researchers have argued that there is a need to define the field's core and the types of research that make the field distinct from other, related fields (Neufield, Fang, & Huff, 2007; Sutton & Arnold, 2002). To date, though, this has yet to occur with respect to technology and human resources. Researchers have used two main terms to describe the field that deals with these phenomena: human resource information systems (HRIS) and electronic human resource management (eHRM). And, unfortunately, researchers have yet to consistently define these terms (Strohmeier, 2007). The term HRIS finds its roots in the broader field of information systems and was originally defined as a:

> system used to acquire, store, manipulate, analyze, retrieve, and distribute information regarding an organization's human resources. An HRIS is not simply computer hardware and associated HR-related software. Although an HRIS includes hardware and software, it also includes people, forms, policies and procedures, and data. (Kavanagh et al., 1990, p. 29)

In many ways, this sounds similar to early definitions of information systems. But, unlike traditional organizational systems that focus on inanimate data (e.g., financial, accounting, marketing data) that managers use for planning and decision making, a HRIS also focuses on data about the people in an organization. As a result, it has become an important mechanism through which job applicants and employees communicate with organizations, develop relationships, and receive key HRM services. Another unique aspect of HRIS is that they may also help organizations attract, motivate, and retain employees. These goals are increasingly important because, in today's knowledge economy, organizations are competing to attract and retain talented and skilled workers. Furthermore, a HRIS's success often depends on the acceptance and use of the system by all internal and external stakeholders (e.g., job applicants, employees), many of whom may not be under the organization's direct control. Thus, although many of the same questions asked by information systems researchers are valid for HRIS, the unique nature of these systems means that new variables and models may be needed to fully capture how to most effectively use them in organizations.

The second term, eHRM, traces its roots to the late 1990s when Web-based commerce, or "e-commerce", was emerging as a disruptive innovation (Lengnick-Hall & Moritz, 2003). Researchers have defined eHRM in many ways. For example, one of the earliest definitions was conducting human resource transactions over the Internet (Lengnick-Hall & Moritz, 2003). Others have defined eHRM as a way of implementing HR practices via Web-based technology (Ruël, Bondarouk, & Looise, 2004). Finally, Stone and Dulebohn (2013) describe eHRM as the mechanism through which organizational stakeholders (e.g., employees, managers, job applicants, etc.) access HR information and functions via the Internet or corporate Intranet. Thus, the term eHRM more clearly articulates the importance of the Internet and Web in the delivery of HR services.

Some researchers have argued that a HRIS is simply the technology used to support back-office HR functions (Ruël et al., 2004; Shilpa & Gopal 2011), but this is a limited view that does not capture the rich complexity of HR systems today. HRIS now support internal operations, managers, and employees and integrates with external systems such as health and retirement benefits and applicant recruitment and tracking. One way to look at these two terms is through how research has practically focused on them. Those researching on HRIS have focused more on the systems themselves and how to design and implement them more effectively (DeSanctis, 1986; Braddy, Meade, & Kroustalis, 2008). Conversely, those discussing eHRM have tended to take a more strategic focus by discussing how these systems transform HR processes (Ruël et al., 2004; Gueutal & Stone, 2005; Lengnick-Hall & Moritz, 2003).

Based on our reviewing research in the field, we believe that HRIS is an umbrella term that encompasses the various HR systems that organizations use, these systems' design and implementation, and eHRM's interactive or communication. Thus, we can best define a HRIS as a system, often Web based, that is used to capture, store, and disseminate information regarding an organization's human resources. It also supports the communication, interaction, and service goals associated with HR processes (e.g., e-recruiting, e-learning, e-benefits). These systems can vary from core HR systems that support basic employee information and HR functionality to "customer-facing" systems that support activities such as recruiting and selecting prospective employees, evaluating employee performance, training employees, managing employee benefits, and other functions. The HRIS helps organizations collect and use the data that supports the HR function and aids applicants, employees, and line managers in making individual and organizational decisions.

eHRM, on the other hand, is the implementation and delivery of HR functionality enabled by a HRIS that connects employees, applicants, managers, and the decisions they make. As Ruël et al (2004, p. 366) note, it is "a way of doing HRM" where technology is the mechanism or platform through which HR processes and functionality are delivered to internal and external stakeholders. Just as e-commerce is enabled through information systems, eHRM is enabled through HRIS. The HRIS field, then, is focused on using HRIS to support the transformation of HR to eHRM, and it focuses on both the HRIS itself and the use of eHRM by organizations.

3   Innovations in Technology and the Field of HRM

As we note in Section 1, the HRM field has undergone tremendous changes in recent years, and it has adopted various forms of information technologies to achieve its goals. Table 1 overviews the history and major evolutionary changes in the HRM and HRIS fields, and, in the sections below, we more fully consider how four different forms of technology (e.g., mainframe computing, client-server computing, Web-based enterprise resource planning systems, and cloud-based software) have influenced changes in the HRM field.

Table 1. Evolution of HRM and HRIS

Timeframe	Evolution in HRM	Evolution in HR Technology
Prior to 1940	Manual record keeping and payroll	
1940s–1950s	Federal tax regulations introduced	Homegrown payroll systems emerge
	Skill inventories and job classifications needed for government and military	Development of electronic data processing systems on mainframe computers to support "personnel" and payroll
	Large companies (GM, AT&T, Mobil, & GE) invest in "personnel" technology	ADP is founded
1960s–1970s	Employment Laws Increase Reporting Needs (CRA 1964, ADEA 1967)	Field of MIS emerges
	Tracking of administrative costs and turnover	Introduction of IBM/360 & other large-scale systems to support HR and organization functions
	Increased government regulation (ERISA, OSHA)	Vendors create software programs for different HR functions
	Increased employee reporting due to increased labor costs	Personnel information systems available for mid-size business due to decreasing costs and evolving technology
	Growing HR data needs brings need to streamline and eliminate data redundancy	SAP founded and R/2 released: precursor of integrated ERP
1980s–1990s	Globalization and expansion leads to integration of all systems (accounting, HR, finance, manufacturing)	Emergence of central servers, LANs, client-server computing, & "microcomputers" allow HR data to be accessed on personal workstations
	HR use analysis & HR planning	PeopleSoft version 1 released
		Decision Support Systems for HR are developed
1990s–2010	Employee empowerment & shifting "ownership" of employee data to employee	Growth of ERP systems for HR (Leading Vendors: PeopleSoft, Lawson, SAP, Oracle)

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	Privacy directive in European Union	Intranets make HR data available more broadly for employees outside of HR
	Move from internal paper processer to external focused strategic partner	Web-based ERP and upgrades to be Y2K compliant
	Global reach for talent	Implementation of self-service systems (ESS, MSS)
	Offshoring of IT & HR call centers	Emergence of "best-of-breed" systems that focus on a single HR function (e.g., e-learning, e-recruiting, etc.). Leading vendors (Kronos, Taleo, Hewitt)
	Development of the balanced scorecard to measure HR effectiveness	Metrics to support reporting requirements of balanced scorecard
	Additional government regulations (e.g. HIPAA, ERISA, etc.)	
2010–present	Continued focus on cost containment and effectiveness of HR practices	Implementation of cloud-based software for HR (leading vendors: Success Factors, Workaday)
	Passage of the Patient Protection & Affordable Care Act	Big data, metrics & analytics to support HR and manage human capital
		Use of social media in recruitment, selection, and employee relations
		Mobile HRIS: large-systems increasingly being developed for mobile devices

3.1 Mainframe Computing (1940s—Mid-1980s)

For its entire history, the HRM field has been shaped by government regulations and reporting requirements. As organizations grew in size and geographic scope, they faced demands to develop more-effective means of recording and storing data on employees and processing functions such as payroll. With World War II and the mobilization of millions of men into the armed forces in the US, both the U.S. Government and organizations realized the need to collect and classify data on employees' jobs. For example, the U.S. Air Force developed and established a more formalized system of job descriptions, the Comprehensive Occupational Data Analysis Program (Kavanagh et al., 2015, Walker, 1982a) for all air force personnel. In addition, in 1943, the Current Tax Payment Act of 1943 required that organizations withhold taxes from employee paychecks. This increased the record-keeping and processing requirements for personnel departments. From basic employee information, such as name, address, phone number to more complicated data, such as computations associated with overtime, federal taxes, and other wage related data, organizations developed and managed records for all employees.

Further, in response to new government regulations, very large organizations looked for ways to standardize payroll, employee records, and employee compensation. Some even began to investigate the use of technology to support payroll processes. For example, large organizations such as GE developed their own mainframe payroll systems (Fletcher, 2005); others began outsourcing payroll processes. One of the first vendors to capitalize on this outsourcing opportunity was ADP, the oldest and longest-lived payroll companies, which was founded in 1949. By the late 1950s, mainframe computers were being used to support payroll applications, some of the first business processed to be automated and supported by information systems. For example, in 1961, ADP was using an IBM 1401 mainframe computer to run payroll for major clients (ADP Website, 2014).

The 1960s and 1970s were characterized by increasing reporting requirements due to the U.S. Government's anti-discrimination laws such as Title VII of the Civil Rights Act of 1964, the Age Discrimination in Employment Act of 1967, and the creation of new regulatory agencies (e.g., Equal Employment Opportunity Commission (EEOC)). During this same time, a small German company, SAP, was founded and began developing applications to support payroll and basic human resource functioning. By 1979, they had a more integrated version, called R/2, which became the pre-cursor of the integrated enterprise systems that companies use today.

Although the HRM field started using mainframe systems in the 1940s, research on HRIS and technology use in HRM was slow to develop. During the mainframe phase of HRIS, the majority of research was practitioner oriented and often focused on how to develop, implement, and use these mainframe systems.

For example, Nardoni (1982) discussed how technology could be used to support different functional areas of HRM. Others focused on how to use structured systems development methodologies to increase the likelihood of successfully implementing systems (Ceriello, 1978; Bloom, 1982). Researchers also began to investigate how organizations used technology to support HRM (DeSanctis, 1986; Tomeski & Lazarus, 1973a, 1973b). An interesting exception to the descriptive, implementation focus of early research on technology in HRM is Smith and Greenlaw's (1967) work. They investigated the development of computer modeling and simulation to assist in personnel selection decisions. Their study represents a significant milestone in the development of the field because it was the first peer-reviewed academic study on the use of technology to support HRM.

In summary, during HRIS's mainframe phase, large organizations began to implement HRIS to automate basic human resource (HR) functions such as payroll and employee recordkeeping in response to government regulations and reporting requirements. Not surprisingly, the use of mainframe computing had a major impact on the HRM field by increasing the efficiency of HRM processes. Technology helped reduce costs and decrease administrative burdens found in most HR departments (Kavanagh et al., 2015). What is surprising is the lack of academic theory or research that has focused on examining the effectiveness of these new systems. However, some practitioner- oriented research focused on understanding how these new systems influenced HRM processes and how they could be implemented successfully (e.g., Tomeski & Lazarus, 1973a, 1973b).

3.2   Client Server & PC-based Applications (Mid-1980s—Mid-1990s)

As Table 1 notes, in the 1980s and 1990s, the development of computer networks allowed organizations to capture, store, and manage data in multiple locations, and databases dedicated to HRM began to move to platforms other than mainframes, such as the personal computer. Organizations began setting up local area networks (LANs) to connect their hardware. In addition, the personal computer's development meant that organizations had a lower cost option than mainframes and that employees and managers could access information from their worksites.

During this timeframe, organizations began to adopt a client-server approach to delivering business applications. Unlike mainframe computing, where power was centrally located and accessible by only those at who worked locally to the mainframe, the client-server approach allowed for processing on both the central computer (likely a mainframe or minicomputer) and on a local personal computer. By doing this, organizations were able to distribute computing power and store employee data in multiple locations. For example, employee records could now be stored in regional offices where local HRM staff could be responsible for maintaining them locally. This way, records were more accessible to managers and others who needed to use the information for personnel decision making, and information was more current and accurate.

The early leader in the client server space was PeopleSoft, which was developed and released for the client-server platform rather than the mainframe (Greengard, 1996). The development and release of PeopleSoft represented a key milestone in the field's evolution because it was the first software package that was designed specifically to support human resources rather than being an add-on to an ERP. Software vendors began to expand product offerings in the HRM space. Products were no longer confined to core HR systems. Vendors began offering PC and client-server based systems in areas such as applicant tracking, performance appraisal, training and development, and HR planning.

During the 1980s and 1990s, the HRM field continued to undergo remarkable changes. For instance, there was a decline in the industrial relations system and private sector unionization in organizations (Kochan, 1986). There was also a shift from a manufacturing to a service economy, and, in the new economy, organizations viewed employees as being critical to their success. Global competition caused organizations to become more concerned with productivity, and, along with the increasing sophistication of information systems, organizations engaged in widespread downsizing, restructuring, and redesigning. Furthermore, organizations began to believe that they competed with others on the basis of the talents and skills of employees, and human resources became an essential function in organizations (Huselid, 1995). Together, these changes increased the emphasis on employee self-control rather than supervisory control. The decentralized client server HRIS enabled organizations to conduct HR planning and HR use analysis to ensure that they were making the most of employees' skills and abilities. This decreased administrative burdens and helped make HR a stronger partner in organizations.

As with the mainframe era, academic research on HRIS did not keep pace with the field's evolution. The majority of studies continuing to be practitioner or case-study oriented focused on how organizations were implementing or using HRIS (Broderick & Boudreau, 1991, 1992; Lukaszewski, Stone, & Stone-Romero, 2008) or what department should be in charge of HRIS implementation and maintenance (e.g., HR or IS) (e.g., Cholak & Simon, 1991). They also examined HRIS managers' capabilities (Simon, 1983), and a few studies examined the success of HRIS (Haines & Petit, 1997; Premkumar & Roberts, 1999).

Despite the continued focus on implementation issues, research was beginning to evolve in other areas of HRM. For example, Briggs and Doney (1989) discussed how organizations could use expert systems to support HR planning. In addition, Sturman, Hannon, and Milkovich (1996) and Sturman and Milkovich (1995) investigated the use of decision support systems to help employees more effectively select the best benefit options for them in a cafeteria style benefits plan. But the area which experienced the greatest growth was e-selection. Organizations were increasingly interested in how they could leverage computers to support the battery of selection tests they were using. Researchers began assessing the equivalence of computer-based and paper-based selection tests (Carretta & Ree, 1993; Silver & Bennett, 1987), the use of video in situational judgment tests (Dalessio, 1994; Smiderle, Perry, & Cronshaw, 1994), the use of DSS for job matching (Green, 1987), and applicant reactions to computer-based testing (e.g., Schmitt, Gilliland, Landis, & Devine, 1993).

In summary, the client server systems in the 1980s and 1990s enabled HRM to achieve many of its important goals by providing managers and HR professionals with data for HR planning and key employment decisions. These systems also decreased administrative burdens and made it possible for HR professionals to become strategic partners rather than reactive maintenance-oriented managers. In spite of the widespread use of these new systems, relatively little research in IS or HRM focused on the effectiveness of these new systems.

3.3 ERP & Web-based Systems (Mid-1990s—2010)

Starting in the mid-1990s, HR departments began to use enterprise resource planning (ERP) or Web-based systems to achieve many of their essential goals including recruitment, selection, training, performance management, and compensation (see Table 1). This era was characterized by an explosion of software product offerings and a move to more integrated, Web-enabled enterprise resource planning systems. This was especially true starting in the early 2000s when Web-based software enabled organizations to centralize all HRM and organizational data so that users could access it through Web browsers at any time or place. For instance, these systems enabled organizations to develop recruiting systems that could be used to attract applicants anywhere in the world and allow them to apply for jobs online through a Web browser. It was at this time that researchers argued that HRM was entering a new era, an era of "eHRM" in which HR transactions were enabled and delivered through Web browsers over the Internet and private networks (Lengnick-Hall & Moritz, 2003). These Web-based systems allowed HR to communicate with both internal and external stakeholders (e.g., job applicants, employees, managers, benefit and payroll providers, etc.).

Vendors typically took two different approaches when offering products: best of breed or an integrated ERP suite. With the best-of-breed approach, organizations purchased and implemented separate systems for each area of HRM such as a core HR system, a recruitment system, a time and attendance system, and a benefits management system. The advantage of a best-of-breed approach to software implementation in HRM was that organizations could identify and implement the software that most effectively met their needs in each specific area to improve performance.

However, these systems often did not integrate well or allow for seamless data transfer, which forced organizations to often transfer data manually between systems. For example, best-of-breed organizations often had to manually transfer data from the talent acquisition software into the core HR system. In addition, each software offering came with a separate login and password, which created challenges for employees. To overcome these issues, many organizations either developed, or had others develop, middleware, software designed to allow data to move between systems that could sit on top of these disparate systems and that provided connections between the software, reduction of manual entry, and even single sign-on capabilities. Another challenge of the best-of-breed approach was that vendors were not likely to upgrade modules on a similar schedule, meaning that the middleware software would need to be continually upgraded to support changes in the various software product offerings.

The other approach organizations used was to purchase an integrated HR ERP as part of a broader organizational-wide ERP or simply one that integrated multiple HR functional areas. Advantages of the ERP approach included simpler software implementations, greater data integration, and easier learning. Conversely, using an ERP meant that the organization was not going to have the best software in each domain and that it often missed out on functionality available in a best-of-breed solution. In addition, the complexity, scope, and expense of these systems meant that they were available for only the largest organizations.

Still, many organizations found many advantages in using an ERP. First, with an ERP, the organization had to only implement one software package, which simplified implementation, maintenance, and IT architecture for the firm. In addition, by having human resource data in one system and integrating those data with the broader organizational data, HR staff and managers were able to have more data available to support performance assessments, make compensation decisions, and manage HR. This seamless integration of data allowed organizations to make more effective use of employee data (Johnson & Gueutal, 2012).

During this time, the HRIS field was characterized by major upheaval with multiple mergers of best-of-breed vendors and consulting firms. Many software vendors developed product offerings in areas such as recruiting or time and attendance and, after becoming successful, became takeover targets for firms seeking to broaden the scope of their HRIS offerings. Examples of best-of-breed vendors included Taleo (recruitment), Kronos (time and attendance), and ADP (payroll) were known for their best-in-class offerings in a specific area. Taleo was purchased by Oracle, and ADP went from being a payroll vendor to moving to become an integrated ERP. Examples of leaders in the HR ERP space included SAP, PeopleSoft, Oracle, and Lawson.

A major innovation during this timeframe was employee self-service (ESS). With ESS, employees were able for the first time to manage their own employee information (e.g., address, phone number, etc.), review and allocate retirement funds, view paychecks, receive company information, enroll in health benefits, and more (Gueutal & Falbe, 2005). ESS was, and continues to be, of interest to organizations due its ability to accrue savings. Estimates suggest that, with ESS, costs per transactions and cycle times decrease by approximately 50 percent (Cedar Group, 2003). Not surprisingly, researchers also took notice of ESS, and they have investigated issues such as the benefits of using ESS in public sector organizations (Hawking, Stein, & Foster, 2004), the factors that affect employees' decision to use ESS, and employees' satisfaction with ESS (Konradt, Hertel, & Joder, 2003; Marler, Fisher, & Ke 2009). The availability of ESS was made greater due to the proliferation of Internet/Web-enabled systems that allowed employees to access their data and use the ESS anywhere they had Internet access and a Web browser.

Finally, during this era of technology, academic research on HRIS began to proliferate. There continued to be a focus on the strategic value of HRIS and adoption considerations (Ruël, Bondarouk, & Van der Velde, 2007; Teo, Lim, & Fedric, 2007). Academic researchers began to realize that, just like in other areas of business, implementing a HRIS provided an organization with an opportunity to transform its HRM (Gueutal & Stone, 2005; Hendrickson, 2003; Lengnick-Hall & Moritz, 2003). As a result, considerable research began to examine the effectiveness and acceptance of e-recruiting (Dineen, Ling, Ash, & DelVecchio, 2007; Stone, Lukaszewski, & Isenhour, 2005), e-selection (Stone, Lukaszewski, Stone-Romero, Johnson, 2013), e-learning (Johnson, Hornik, & Salas, 2008; Salas, DeRouin, & Littrell, 2005), e-performance management (Payne, Horner, Boswell, Schroeder, & Stine-Cheyne, 2009), and e-compensation (Dulebohn & Marler, 2005).

Unlike previous eras, in this era, the evolution in technology was beginning to stimulate research questions for academics in multiple functional areas of HRM. For example, researchers investigated the extent to which an e-recruiting system affected individual's interest in applying for a job with an organization (Dineen et al., 2007; Braddy et al., 2008) or employee satisfaction with employee benefit systems (Huang, Jin, & Yang, 2004). Others investigated the acceptance of eHRM while acknowledging the importance of communications and the need of these systems to meet both organizational and employee needs (Stone, Stone-Romero, & Lukaszewski, 2006; Stone & Lukaszewski, 2009). Some research also assessed the effectiveness of these systems, especially e-recruitment (Galanaki, 2002) and e-learning (e.g., Johnson et al., 2008). The proliferation of the Web and best-of-breed online selection tests provided researchers with expanded opportunities to investigate issues surrounding the equivalence of Web-based selection tests and applicant reactions to them (see Stone et al., 2013, for a review of this literature).

One of the biggest changes during this era was the explosion of academic research on the use of Web-based recruitment and e-learning. With the adoption of the Web, many organizations began to use the Internet to attract job applicants. The move to the Web was so pronounced that, by the early 2000s, over 70 percent of firms were using e-recruiting as an important part of their recruitment practices (Cedar Group, 2003). A large number of empirical studies looked at how website characteristics and design affected recruitment factors such as applicants' perceptions of firms, applicants' attraction to organizations, and their intention to apply for jobs (Allen, Mahto, & Otondo, 2007; Dineen & Noe, 2009). In addition, a great deal of research began to examine the effectiveness of e-learning systems (Johnson et al, 2008; Salas et al., 2005). Most of these studies assessed three types of antecedents to e-learning effectiveness: training technology, training design, and trainee characteristics (Johnson et al., 2008).

In summary, during the 1990s to 2010, HR departments began to use ERP or Web-based systems to achieve many of their essential goals including recruitment, selection, training, performance management, and compensation (see Table 1). For example, organizations began to use Web-based recruitment systems to attract applicants and allow them to apply for jobs online. They also began to employ e-learning systems to deliver training to employees, and increase the flexibility, convenience, and costs associated with traditional training methods (Salas et al., 2005). Along with the increased use of Web-based systems in industry, there was also an explosion of research on the effectiveness and acceptance of these new systems (Gueutal & Stone, 2005; Kavanagh et al., 2015). It is clear from this research that Web-based systems have increased the efficiency of HR processes and expanded access to job applicants, employees, retires, and human resource managers. However, research has not shown if these new systems enable HRM to achieve its primary goals of attracting, motivating, and retaining employees (see Stone et al., 2015, for a review of this literature).

3.4   Cloud-based Applications (since 2010)

For the past several years, human resource professionals have been occupied with moving HRIS capabilities to the cloud and its relevance to HRM. Unlike previous generations of HRIS software, which was installed at the client's location and often customized to fit their needs, cloud computing delivers software to clients as a service[1]. With cloud computing, rather than designing and customizing software to meet each organization's needs, vendors now offer a standard software product to all firms. Although the software is not customizable, each organization can configure it to meet their own specific needs. Organizations no longer have to purchase and maintain hardware and software but instead access the software over the Web though a Web browser. This can reduce up-front capital expenses such as hardware and software purchases and can reduce the need for internal IT staff because much of the technical responsibilities are outsourced to the cloud vendor. In addition, industry research has shown that those organizations using cloud-based HR software are more likely to use the latest version of that software (CedarCrestone, 2011) that those using an on-premise deployment approach. The move to cloud-based applications is transforming the delivery of HRIS functionality: over 50 percent of surveyed organizations have indicated that they were planning to move to the cloud (Towers Watson, 2012). This is providing many opportunities for new software vendors to enter into the market and reach both large and small organizations. Small organizations that previously could not afford to deploy HR technology due to the large up-front investment requirements were now able to consider investing in cloud systems due to the reduced cost of ownership. The current leaders in cloud-based ERP include Oracle, SuccessFactors, and Workday.

The move to cloud computing has also coincided with an increased use of mobile and social technologies. Software vendors are offering cloud-based solutions that are compatible with mobile devices, and some vendors, such as Workday, are pursuing a "mobile-first" approach to software development (Wilson, 2013). In addition, organizations are continuing to adopt social media to support human resources. A recent study of over 400 HR managers in the UK found that over 50 percent of organizations were using, or were planning to use, social media to support hiring decisions and that they were planning to increase their use over time (Broughton, Foley, Ledermaier, & Cox, 2013). Through cloud, mobile, and social technologies, this fourth generation of technology deployment (e.g., the cloud) has the potential to

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[1] We acknowledge that this definition does not capture the full richness of cloud-computing that goes beyond Internet-based software as a service and includes infrastructure and platform services. But, for companies investing in HRIS, cloud-based software as a service is the major form of cloud computing being used.

dramatically impact how organizations use HR technology and how organizations recruit and select employees.

As with previous eras, research on HRIS continues to focus on the strategic value of technology in HRM (Grant & Newell, 2013) and the factors that affect the adoption of these systems. In addition, researchers continue to use the technology acceptance model (Davis, Bagozzi, & Warshaw, 1989) to explain why applicants or employees use HRIS (Kashi & Zheng, 2013). Researchers are also bringing in models of decision making and applying them to the HRM context (Dulebohn & Johnson, 2013). But communication and knowledge sharing between IS and HRM is still poor.

Continuing the interest from the ERP era, researchers in this area have focused on how the Web is transforming recruitment and selection. For example, the impact of website design on applicant perceptions of the organization continues to be of interest to researchers (Dineen & Allen, 2013; Gregory, Meade, & Thompson, 2013). Finally, the use of technology in selection continues to be of interest to researchers (Oostrom, Born, Serlie, & van der Molen, 2010; Reynolds & Dickter, 2010). Note an important milestone in the field of HRIS occurred when Stone et al. (2013) published a systematic review of research on applicants' reactions to the equivalence and validity of using technology to support selection. This represented the first paper to systematically review the role of technology in one functional area of HRM.

With the global reach of the Web and these new cloud-based systems, organizations are implementing novel ways of delivering HR functionality, especially in employee selection. Specifically, organizations are increasingly using unproctored internet testing (UIT) and social media as part of the selection process, and researchers have begun to assess their relative effectiveness. With UIT, a job applicant takes a selection test, such as a cognitive ability test or a personality test, online in a non-controlled setting. The use of UIT presents several risks for organizations such as cheating and non-equivalence with other forms of testing (e.g., paper-pencil tests or proctored computer-based tests). Despite these concerns, researchers have argued that UIT forms the majority of testing done by organizations today (Pearlman, 2009). As such, they have begun to investigate the validity of these tests (Beaty et al., 2011) and how to reduce these risks associated with UIT by using techniques such as cross validation studies (Makransky & Glas, 2011) or advanced statistical techniques to improve the validity of these tests and reduce the impacts associated with cheating (Tendeiro, Meijer, Schakel, & Maij-de Meij, 2013). Still, much of this research has been conducted by HR scholars and does not investigate how the design of these systems could be enhanced as well. This is an area where scholars from IS could add value to the discussion.

Social media use has stimulated research on its use as a selection tool. Researchers have looked at the benefits and risks of social media (Davison, Maraist, & Bing, 2011; Brown & Vaughn, 2011) and how personality can be inferred from social media websites (Kluemper, Rosen, & Mossholder, 2012). Although this research has not demonstrated the predictive validity of using social media in hiring decisions, this fact has not stopped organizations from embracing social media as part of the hiring decisions. But the use of social media in hiring produces several legal issues such as discrimination and adverse impact (Kluemper et al., 2013).

4 Evolution of the HRIS Academic Field

As we can see, the HRIS professional field has been driven primarily by evolutions in the technology supporting the human resource processes and functions. Not surprisingly, much of the innovations have come in the past 20-25 years as advances in computing power and reductions in costs have decreased. No longer the domain of only the largest organizations, HRIS being developed are now available to organizations as small as 5-10 individuals. But the academic development of HRIS has lagged behind even this and has especially lagged behind the broader field of information systems. For example, in the last few years, HRIS scholars have been asking whether technology can make HRM more strategic or if it adds strategic value to HRM (Marler, 2009; Bondarouk and Ruël, 2013). These discussions harken back to the debates around the technological imperative (Markus & Robey, 1988) and the productivity paradox (Brynjolfsson, 1993) conducted by IS researchers many years ago. But these papers do not consistently refer back to these classic studies or build on them. Instead, HR scholars engage in a debate between themselves and HR practitioners and often miss the rich IS literature from which they could draw.

Part of the reason for this is that IS researchers often do not have training or a background in human resources. In addition, many of the important eHRM research questions involve issues such as the transformation of HRM processes or applicant or employee reactions, which often do not directly concern

the IT artifact. Thus, researchers in information systems may be less likely to pursue research in this area. HR researchers, conversely, are not typically technologically oriented nor do they receive in-depth training in information systems. As Jones and Hoell (2005) note, few HR programs even incorporate information systems concepts. In addition, we are aware of only one university, the University at Albany, who offers a degree (MBA) in HRIS. Thus, few IS or HR scholars may have the interest and skills to build a research tradition in HRIS that lie at the intersection of these two fields. This has contributed to the slower progress in the development of a research tradition in HRIS because many HRM scholars are unlikely to understand the technological aspects of the field or find them interesting.

4.1 HRIS Milestones

Despite the perceived gulf between the HR and IS fields, there are have been major milestones in the development of the HRIS field that have come from both IS and HR researchers, which suggests that the HRIS field has begun to mature through these contributions. Key milestones include the first paper on the use of technology to support "personnel administration", which was published in Management Science. In this paper, Smith and Greenlaw (1967) investigate the value of using computer simulations to simulate the decision making processes of those administering and interpreting selection tests. In addition, the first paper published in MIS Quarterly was published by DeSanctis (1986) who investigated how organizations were using technology to support human resources. It is interesting that the first paper published in a major HR and psychology journal was also published in 1986 and that it is focused on using computers to interpret the results from selection tests (Vale, Keller, & Bentz, 1986).

Another major field milestone was the development of the first concentration/major in human resource information systems. In 1986, the University at Albany (UAlbany) in New York graduated its first class of students educated in HRIS. These MBA students were among the first to enter into HRIS. The program, now almost 30 years old, has graduated over 300 students, many of whom are HR professionals, HRIS consultants, and owners of small consulting firms. Some have now advanced into the C-suites of small and large organizations. A hallmark of this program is providing students with access to the leading software available. For example, UAlbany was one of the first academic programs to adopt PeopleSoft (installed on floppy disks!), and, today, the program actively seeks out student opportunities to use cutting edge software such as SuccessFactors Employee Central and Oracle Fusion.

The Society of Human Resource Management (SHRM) has also identified HRIS as an area of importance in HRM education (SHRM Curriculum Guidelines, 2013). But, unfortunately, an examination of HRM programs by Jones and Hoell (2005) revealed that less than 40 programs in the US had a course on human resource information systems, and there is no evidence to suggest that this situation has improved. With technology transforming the profession of human resources, schools need to infuse HRIS content into their classes. This presents a tremendous opportunity for information systems faculty to contribute to this education by developing expertise in human resources and developing boundary-spanning skills that help educate students in an area with tremendous growth opportunities.

Further, with classes and a university program in HRIS, the field required a textbook. The first such textbook was Human Resource Information *Systems: Development and Application* by Mickey Kavanagh, Hal Gueutal, and Scott Tannenbaum (1990). In this book, the authors define what a human resource information system is, the process for developing these systems, and the value of using the personal computer and client server applications to support human resources. Gueutal and Stone (2005) edited a book on the role of technology to support human resources practices. This book represented the field's first attempt at collecting the research on HRIS and making recommendations to professionals regarding how it can be used to change the practice of HRM and how technology would change the relationship of HR with the employees. Finally, a new book on HRIS was published in 2009 and is now in its third edition (Kavanagh, Thite, & Johnson, 2015). This book brings together leading scholars from HR/HRIS who each focus on a different issue within HRIS and how it affects the design, implementation, and use of HRIS. For example, topics include traditional IS topics such as the systems life cycle, database design, information security, and how technology affects different functional areas such as recruitment, selection, training, and HR administration.

4.2 HRIS Special Issues

Another indicator of the growing maturity of the HRIS field is the increasing frequency of special issues that focus on HRIS. Since 2009, there have been six special issues in both information systems journals and human resources journals. The first special issue on eHRM and HRIS was published in 2009 in the

Journal of Managerial Psychology. The first special issue published in an information systems journal was in 2010 in the *Journal of Electronic Commerce Research*. And, in 2013, there were special issues in two highly respected journals in both HR and IS (e.g., *Journal of Strategic Information Systems* and *Human Resource Management Review*). Although it is heartening to see the growing interest in HRIS and the associated special issues, many of the research studies included in these special issues were case studies of implementations or discussions of field trends. A notable exception to this, and a study that represents an important research milestone in HRIS, is Stone, Lukaszewski, Stone-Romero, and Johnson's (2013) paper. In this study, the authors systematically review the literature on e-selection and develop a set of hypotheses and a research agenda for moving research on e-selection forward. This is an important research milestone in the field and represents the first study to conduct a literature review in a specific area.

4.3 Surveying Published Research on HRIS

Using technology to support HRIS currently extends back nearly 60 years, and the research extends back to 1967. Thus, we reviewed the literature for the years 1967-2014 as follows: first, we searched for papers using databases such as EBSCO Academic Search Complete, Science Direct, and the ACM Digital Library using search terms such as "human resource information systems, electronic human resource management, eHRM, e-recruiting, e-selection, e-compensation, and "technology & job analysis". Next, we reviewed each paper's references for additional papers on HRIS. Subsequently, we reviewed each subsequent paper for additional references. We repeated this process until we found no additional papers.

Via this search, we found 476 papers published in academic journals and trade publications. Of these, 171 were practitioner oriented and focused on things such as identifying what vendors to use when implementing software (Briggs & Doney, 1989), using spreadsheets to improve tracking and reporting of HR data (Boudreau & Milkovich, 1990), and discussing what type of information to put into a HRIS (Walker, 1982b). Thus, we discarded these papers.

We reviewed the remaining 305 papers and organized them by their type (e.g. theoretical, case study, empirical (lab or field), or survey), by the era in which they were published, and by the functional area in which they were published. Table 2 summarizes the results of our analysis. Note that we chose not to investigate e-learning because the volume of studies conducted in this area were so large as to make it unfeasible to summarize in this study and because there have been numerous meta-analytic and review studies on Web-based training and e-learning (see Sitzman, Kraiger, Stewart, & Wisher, 2006; Sitzman, 2011; DeRouin, Fritzsche, & Salas, 2004 for examples).

From the overall perspective, we can see that the interest in HRIS is growing and continues to grow. In the 18 years of HRIS research during the mainframe era, there were 22 studies on HRIS, and the vast majority of these (17) focused on issues such as HRIS administration and adoption. This grew to 37 studies during the client-server era. But research really began to thrive during the ERP era with over 192 papers published. Moreover, since 2000, 54 papers have been published. As an additional point of comparison, the annual publication rates for studies on HRIS grew from approximately 1.2 per year during the mainframe era to 13.5 per year during the current (cloud) era.

In addition, an analysis of the study types conducted suggests that researchers have used a variety of approaches to study HRIS. Theoretical papers were the most common type of research study published (102), but both survey research (69) and empirical lab and field studies (92) were common. Finally, many case studies were also undertaken (42).

A third observation, which echoes our earlier comments earlier about the gap between MIS and HR scholars, is that the vast majority of the papers (239 studies) were published in HR/management journals, which are often not read by those in MIS with a more technical focus. Contrast that to the 57 studies that were published in IS outlets (broadly defined). Thus, opportunities exist for IS researchers to add to the research discussion about designing and deploying HRIS in organizations.

Table 2. HRIS Research Publications By Era and Function

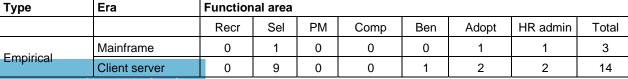| Type	Era	Functional area							
		Recr	Sel	PM	Comp	Ben	Adopt	HR admin	Total
Empirical	Mainframe	0	1	0	0	0	1	1	3
	Client server	0	9	0	0	1	2	2	14

Table 2. HRIS Research Publications By Era and Function

		Recr	Sel	PM	Comp	Ben	Adoption	HR Admin	Total
	ERP/Web	20	30	1	1	1	9	7	69
	Cloud	1	4	0	0	0		1	6
	Total	21	44	1	1	2	12	11	92
Theory	Mainframe	0	2	0	0	0	1	6	9
	Client server	0	3	0	0	0	1	9	13
	ERP/Web	11	27	0	1	0	8	18	65
	Cloud	1	6	1	0	0	0	7	15
	Total	12	38	1	1	0	10	40	102
Case study	Mainframe	0	2	0	0	0	0	2	4
	Client server	0	1	0	0	0	0	4	5
	ERP/Web	3	6	0	2	2	6	7	26
	Cloud	1	0	0	0	0	1	5	7
	Total	4	9	0	2	2	7	18	42
Survey	Mainframe	0	0	0	0	0	6	0	6
	Client server	0	2	0	0	0	2	1	5
	ERP & Web	13	8	0	0	2	6	3	32
	Cloud	8	2	0	0	0	7	9	26
	Total	21	12	0	0	2	21	13	69
	Total	58	103	2	4	6	50	82	305

Note: Recr = recruitment, Sel = selection, PM = performance management, Comp = compensation, Ben = benefits, Adoption = adoption of HR systems, HR Admin = HR/HRIS administration

Scholars interested in publishing in eHRM and HRIS, it is important to better understand which journals are more likely to publish this research.. Not surprisingly, with the growing interest in research on e-selection, the journal with the most publications is the International Journal of Selection & Assessment with 37 papers. Interestingly, given the relatively lower amount of publications in IS journals, the second most popular outlet was in Computers in Human Behavior with 12 papers. But, even after nearly 50 years of research, other than the special issue in the Journal of Strategic Information Systems in 2013, we are aware of only one study that has been published in leading IS journals, and this paper was published nearly 30 years ago in MIS Quarterly. Contrast this with publications in HR/management journals where journals such as the Journal of Applied Psychology and Personnel Psychology both have 11 publications on HRIS each. This analysis provides some evidence that research on HRIS has become more ingrained and accepted in the HR community but not yet in the IS community. Table 3 shows a full list of journals with more than ten papers published in the area of eHRM & HRIS.

Table 3. HRIS Research—Top Publication Outlets

Journal	Number of Papers
International Journal of Selection and Assessment	37
Computers in Human Behavior	12
Human Resource Management	11
Journal of Applied Psychology	11
Personnel Psychology	11
Human Resource Management Review	10

In addition to the publication imbalance between IS and HR outlets, we found a definite imbalance between the various functional areas investigated. As we note previously, there has been a large interest in the impacts of technology on the processes and outcomes of selection. And our analysis of published papers supports interest this with over one third of the studies (103) we analyzed focusing on e-selection. The second most popular area of research was on HR administration with 82 papers. These studies were much more focused on the design of systems and their strategic considerations for human resources that come with introducing and using these systems.

Together, these two areas account for nearly 2/3 of the published studies on HRIS. What is particularly of interest is the dearth of research on the use of technology in compensation, benefits, and performance management.

5 IS Theories and Research Opportunities in HRIS

In reviewing the literature, we see a number of interesting opportunities for IS researchers to contribute to the further development of HRIS. We note that our discussion is meant to be illustrative of where IS researchers can contribute rather than exhaustive. First, e-commerce research can inform the areas of e-benefits or e-recruiting. For example, there is a growing awareness that recommendation agents can improve consumer purchase decisions and the online shopping experience (Xu, Benbasat, & Cenfetelli, 2014). One of the major concerns for employees is which employee benefits in an array of options are the best. Those organizations offering online benefits systems have designed them to be consumer oriented and mimic online shopping sites. So, research on using recommendation agents could contribute to the design of more-effective benefits systems and to better understand how to help employees make more-informed benefits decisions. In addition, one of e-recruiting's major purposes is to increase the likelihood that a job applicant will accept a job if offered. Thus, concepts from recommendation agents used by either hiring firms or consumer-oriented sites such as glassdoor.com help applicants make more informed job choices and to improve post-hire outcomes.

A second area of research that could be drawn on is design science. Experts in design science could contribute to the discussion on HRIS design, development, and administration. As we note above, many researchers in HRIS view technology as static tool implemented by a firm rather than the more nuanced view often taken by IS scholars. Design science research could help HRIS researchers inform software vendors on how to more effectively develop systems for organizations. Although many of the design principles should remain consistent across functional areas, researchers could add value to the field by incorporating these design considerations for the multiple types of devices HR professionals are increasingly using to access data and functionality. In addition, researchers could identify issues in HRM that may affect HCI design considerations that are different than in other areas, such as supply chain or accounting.

A third area of research, one which we believe is critical to moving the HRIS field forward, is decision support systems. DSS are particularly important for HRM given the central nature of decision making inherent in using HR data in organizations. For example, organizations have to evaluate the effectiveness of their hiring decisions and their compliance with relevant laws. Managers also use data to make decisions regarding which applicants to hire, how to structure compensation for all employees across the firm, and how to evaluate performance. In addition, employees have to make decisions in regards to which benefits to sign up for (e.g., healthcare, flex spending, retirement) and then have to manage their accounts. This is of particular importance for retirement benefits where employees are responsible for managing their own 401K portfolio, often with only limited formal training in managing financial assets. Researchers have begun to investigate the role of technology and investing experience in online investing (Looney, Akbulut, & Poston, 2008), but more research is needed to help organizations better develop tools to assist employees in managing their 401K.

As the above examples illustrate, DSS support is needed across a wide variety of HR functions, and more research is needed to understand how technology can be used to help the varied types of decisions made by HR personnel, managers, and executives (Dulebohn & Johnson, 2013). Although there have several studies that have discussed the use of DSS and expert systems in HRM (Beckers & Bsat, 2002; Sturman & Milkovich, 1995), there has yet to be a systematic approach to studying the use of DSS by HR professionals. This a great opportunity for HR and IS scholars to work together to develop a systematic program of research on the DSS in the context of HRM decisions.

In addition, research on the adoption and use of technology is needed in HRIS. This is especially true given the richness of research in information systems that uses theories such as the technology acceptance model (Davis et al., 1989) and the unified theory of acceptance and use of technology (Venkatesh, Morris, Davis, & Davis, 2003). IS scholars can work with HR scholars to adapt these theories to the HR context, identify factors common to both IS and HRIS, and identify factors that may be unique to an HRIS (due to the storage and use of employee rather than inanimate data).

Fifth, outsourcing of HR services is a rapidly growing trend in HR, but limited research has focused on how to most effectively implement HR outsourcing. HR outsourcing requires a mix of technical and functional knowledge, and IS researchers have written substantially on how to effectively outsource and backsource IT services (Lacity & Willcocks, 1998; Veltri, Saunders, & Kavan, 2008). Although HR scholars have begun to investigate HR outsourcing (Klaas, McClendon, & Gainey, 1999), research lacks the depth and maturity of research on IT outsourcing. Because HR services are often outsourced, organizations will likely face many of the same issues and decisions in outsourcing that they did when outsourcing IT services. Therefore, researchers from IS could contribute theories to help organizations and researchers understand HR outsourcing decisions to a depth that they have yet to have investigated.

Finally, given the lack of technological focus in HR, research is needed that contributes to the discussion on the strategic value of HRIS to firms. Much of the research in HR on this area has not yet integrated the research from information systems on factors such as IT productivity (Brynjolfsson, 1993) and managing IT infrastructure (Weill & Broadbent, 2000). Some are even asking if technology "makes the HR function more strategic" (Marler, 2009, p. 515), a technological imperative approach that brings to mind the rich discussions IS researchers have had about the nature of technology and organizational change over 25 years ago (Markus & Robey, 1988). Given the continued conversations about eHRM and HR strategy, IT researchers can make valuable contributions to our understanding of how technology and processes can evolve and help the HR department become more effective.

6   Conclusion

As this paper shows, the professional and academic field of eHRM/HRIS has evolved greatly since the advent of the mainframe computer and the discussions surrounding best practices for implementing a HRIS. But, even after 40 years of scholarly attention on using technology to support human resources, we argue that the field has barely begun to delve into the deep, interesting, and valuable questions that will help managers and organizations better understand how to most effectively deploy HR technology in their organization. To do this though, we need more boundary-spanning researchers who embrace both HR and IS theories and technologies. In addition, for the field to move forward, we need scholars from both fields to work together to bring insight into the most pressing questions. We hope that this brief history of the HRIS field stimulates conversations among scholars from both human resources and information systems to continue the conversations about HR technology and the importance of both IS and HR contributions to these conversations.

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