The Practice of HRIS Applications in Business Organizations in Jordan: An Empirical Study

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Abstract
The study aims at investigating the extent of the applications of Human Resources Information Systems (HRIS) being practiced in Jordanian business organizations. The study is based on primary data collected through a structured questionnaire from the HR personnel of 236 out 275 of shareholdings companies. The results indicate that the extent of HRIS being practiced is considered to be moderate. This implies that there are some variations among business organisations in terms of their level of implementing of HRIS applications. The results also showed that the extent of HRIS applications being practiced were found varied among business organizations based on their type of business and length of time in business. However, there were not found varied due to their size of business.
Keywords: HRIS applications, HRIS practice, Business organizations, Jordan

1 Introduction

Over the past two decades there have been extensive studies on the adoption and use of HRIS. While some have examined the type of applications that dominate HRIS (e.g. Clark, Grant and Heijltjes 1999, Ensher, et al., 2002; Jain, 2014; Fagan and Ployhart, 2015), and the necessary antecedents for the successful implementation of HRIS (Yeh, 1997) as well as the conditions that support successful HRIS (Haines, 1997), others have investigated the organizational adoption (e.g. Panayotopoulou, et al., 2007; Lau and Hooper, 2008). Generally, the majority of these studies were performed in developed countries (Panayotopoulou, et al., 2007), with few considering developing countries. HRIS in Jordan can be considered as a new IT tool in business originations. The main purpose of this study is to explore the extent of practice of HRIS applications at the organization's level. This is important for more than one reason. First, it provides some insights into the extent of implementation of HRIS applications by companies operating in Jordan, which should help HR practitioners acquire a better understanding of the current status, benefits, and barriers to the implementation of HRIS applications. Second, professionals should be informed about the advanced state of HRIS applications in Jordan.

Problem Statement

Over recent years a large number of studies have explored IS applications and usage (Masa'deh, 2013; Obeidat, et al., 2014; Masa'deh, et al., 2015; Lizcano, et al., 2016). While the majority of these studies have focused on the type of applications that are common in IS (Krishn and Bhaskar, 2011; Kundul and Kadian, 2012; Saharan and Jafri, 2012; Chalmeta and Pazos, 2015), and the technical resources required for the successful implementation of IS (Yeh, 1997) as well as the conditions that support successful IS (Haines, 1997; Florkowsk and Olivas-Lujan, 2006), few of them have focused on the organizational implementation of HRIS applications. Further, these studies can be classified according to their regional and functional focus. Concerning the regional focus, the majority of these studies were conducted in developed countries (Panayotopoulou, et al., 2007, Ngai and Wat 2004), while studies in developing countries are rare and tend to involve a few countries (i.e. Malaysia, Taiwan). With most studies of "HRIS" implementation being based on cases in Europe and the USA, the cultural factors, although complex, show some consistency. However, relatively few studies have been investigated outside the most developed countries, such as in Jordan.

Research Questions and Objectives
The research questions of this study relate to the factors that influence the level of utilization of HRIS applications in Jordanian business organizations. The specific questions to be examined are:
- What is the extent of practice or uses of information technology system applications by HRM ? and ,
- Are there any differences of the practice of HRIS applications among studied organizations in terms of their size, experience and type of business?

The main objectives of this study are as follows:
- The study mainly aimed at finding the applications of HRIS in business organizations in Jordan. The specific objectives can be identified as:
- To evaluate to what extend HRISs are being practiced in recruitment & selection, training & development and in payroll system of the business organizations
- To find out whether the practice of HRIS applications are different among business organizations due to their size, experience, and type of business

HRIS Overview: Definition and Applications
Definition of HRIS: Recent research has revealed quite a number of definitions of HRIS, stemming from the seminal definition promulgated by DeSanctis (1986):"a systematic procedure for collecting, storing, maintaining, retrieving, and validating data needed by an organization about its human resources, personnel activities, and organization unit characteristics. It is generally a collection of databases that integrate together to form a vast record of all employee issues that exist within a company. Its development has been evolutionary". (DeSanctis, 1986. p16).

Tannenbaum (1990) defined HRIS as a technology-based system used to acquire, store, manipulate, analyse, retrieve and distribute pertinent information regarding an organisation's human resources, consistently. Kavanagh, Gueutal and Tannenbaum (1990) defined it similarly as a system used to acquire, store, manipulate, analyse, retrieve and distribute information regarding an organisation's human resources. Bohlander and Snell (2011) define "human resources information systems as a system that develops current and accurate information for decision-making and monitoring. As they report, according to a recent survey, most of applied information technology has been to maintenance staff's information, monitoring salary operations, keeping information about absences and doing administrative affairs and employment and training programs. Computerized system is just for collecting, storing, maintaining, retrieving organization's required data about its employees. In addition to the above usages they are developed to help planning, administrative functions, decision making and controlling human resource management activities.

Hendrickson (2003) put emphasis on the notion of HRIS which, in his view, is seen as crucial to any organizational information system having many facets. In such view, HRIS is not only represented by computer based tasks or HR-related programs; rather it comprehensively involves people, structures, strategies, processes and information. In a similar vein, HIRS is believed to be a systematic process of "collecting, storing, maintaining, retrieving and validating data needed by an organization about its human resources, personnel activities, and organization unit characteristics" Kavanagh, Gueutal and Tannenbaum (1990: 8).

In the year (2007), Strohmeier came up with the relatively new term e-HRM which he used to designate the action of designing, adopting and implementing data technology. Such kind of technology was utilized for connecting two or more people in the form of group work, helping them to perform HR-related tasks. In terms of difference between HRIS and e-HR, one can confidently claim that the former term is chiefly concerned with the HR unit itself while the latter refers to those who handle such programs. By and large, these systems are directed towards the betterment of the processes within HR departments. Using e-HR, the target group is not HR staff but rather staff working in other departments such as the management or other employees. In such system of e-HR, HRM services offered in form of intranet used by employees.

The variation between HRIS and e-HR may be described as the change from the computerisation of HR functions to computer-provided data for such functions. Some researchers deal with HRIS, or visualize it from an HRIS point of view, but they confuse matters with e-HR when they begin to promote their concepts. For example, the so-called stage-oriented approaches regarding the relationship between IT and HRM at a certain stage step over to e-HR. Technically speaking, it can be said that e-HR is the technical unlocking of HRIS for all employees of an organisation.

HRIS Applications: Researchers have made various suggestions regarding how HRIS applications may support organizational processes (Hendrickson, 2003; S.C. Kundu, Rajesh Kadian, 2012). A number of the HRIS applications that have been defined by these researchers are outlined according to the HRM basic tasks in Table (1). For example, Byars and Rue (2004) reported several applications for HRIS, such as clerical applications, applicant search expenditures, risk management, training management, training experiences, financial planning, turnover analysis, succession planning, flexible-benefits administration, compliance with government regulations,

attendance reporting and analysis, human resource planning, accident reporting and prevention and strategic planning. In addition to data storage, the HRIS system also allows certain tasks to be completely much easier than they would be by hand, as well as reducing the amount of paper that HR departments must store. These applications are outlined below.

1. ***Recruitment and Selection*:** One of the main activities of HRM is staffing. Staffing is important because it provides a supply of individuals needed to fill the jobs within an organization necessary to achieve business objectives. Once HR professionals have undertaken job analysis, a job description can be prepared. Such job description is used when recruiting individuals. E-recruiting, or Internet recruiting, is one of the methods available to HR professionals that may be integrated with HRIS.

2. ***Training and development***: Which provides a system for organizations to administer and track employee training and development efforts. The system, normally called a learning management system (LMS), if a standalone product, allows HR to track education, qualifications and skills of the employees, as well as outlining what training courses, books, CDs, Web- based learning or materials are available to develop certain skills. Courses can then be offered in date-specific sessions, with delegates and training resources being mapped and managed within the same system. Sophisticated LMS allows managers to approve training, budgets and calendars alongside performance management and appraisal metrics. Research on HRM (Kirrane, 1990) defines the employment of Web access in staff training and professional growth. Web-based training (WBT) is a common method of self-education through computer programs, the Web and the different networks. Advancements in Web technologies in recent years provide a promising new avenue for the development of training support applications. Attributes such as instant communication and capability to send information back and forth without errors are two important advantages of incorporating Web technologies in training needs assessment. Meade (2000) emphasized that Web-based HRIS software provides self-service convenience to the employees and managers via the Internet for mutual communication.

3. **Payroll Administration:** The payroll module automates the pay process by gathering data on employee time and attendance, calculating various deductions and taxes, as well as generating periodic pay cheques and employee tax reports. This module can contain the entire staff-related business, and can also conjoin with the finance administrative units established some time before a firm adopted HRIS. The administration of traditional payrolls comprised a tiresome and time-consuming task that could be liable to error, taking into consideration the many details needed, such as the original wage minus or plus different payments. An HRIS can streamline this process; generally the payroll staff member only needs to enter the hours worked (or possibly not even that for companies using an electronic time clock integrated with the HRIS), and then the system will use a series of steps and procedures to do all of the calculations for the employer. Pay cheques are then quickly printed and distributed.

4. **Benefits Administration:** The management of the general staff benefit policies in large organizations requires a huge amount of written work and information, something that can be more efficiently performed if HRIS is employed. The system can track benefit eligibility dates, trigger reports to remind HR to notify employees, allow benefit choices to be quickly inputted, and deductions can be triggered on the payroll side of things, all of which reduces the communication and paper flow between HR and payroll staff in addition to reducing the likelihood of errors being made at any step in the process.

5. **Compensation Management/Administration:** It provides a system for organizations to administer and track employee participation in benefits programs. These typically encompass insurance, compensation, profit sharing and retirement. This process needs all sorts of information to be gathered and administered, especially the nature of the accident or sickness, the individuals implicated, medical reports, regulations controlling staff behavior, and government information (Hendrickson, 2003). Studies of the payroll interface have been conducted for areas such as record keeping, pension calculations, and retiree payments and statements (e.g. Andrew and Satish, 2001). The Internet provides a real-time way of allowing employees to review information on the breakdown of salaries, deductions and accumulated balances. Organizations gather data on salary, wages and other benefits to streamline inputs to the payroll, benefits and compensation application online.

6. ***Performance Appraisal*:** Although relatively few research studies have focused on the online application of performance appraisal (Hansen and Deimler, 2001), the Internet plays an important role in reducing the effort and agony of managing performance evaluation. Normally, staff members have their performance reviewed periodically. Performance reviews become immediately available to those involved, including supervisors, colleagues, clients and others.

7. ***HR Planning***: Effective HR planning is the process or system that assigns the correct number of qualified employees to the right task at the right time. One reason for the increased use of the Internet to support HRM is that the Internet is essential if HR managers want to achieve business-related goals (Walker, 1993). These technological changes are thought to increase the ability of HR practitioners to monitor the workforce,

produce reports easily, utilize employee skills effectively and even reduce labor costs.

8. **Internal and External Communication:** The Internet and intranets provide effective channels for organizations to enhance the process of internal and external communication. Concerning internal communication, staff can directly contact each other at the entire hierarchical structure of the firm. They can access up-to-date and relevant information when they connect to the Internet. Externally, individuals can use the Internet to link and share data across other departments in different branches, including internationally-operating ones (Karakanian, 2000).

9. **Self-Service (including Web portal):** Permits staff to request HR information and conduct some HR requirements through the system. Staff may request their attendance reports directly from the system, and not from HR units. The program permits administrators to endorse and request from their subordinates through the system without overloading the task on the HR department. Many organizations have gone beyond the traditional functions and developed HRM information systems, which support recruitment, selection; hiring, job placement, performance appraisals, employee benefit analysis, health, safety and security, while others integrate an outsourced applicant tracking system that encompasses a subset of the above. O'Connell (1996) indicated that a firm can assign responsibilities via communication between employees in order to enable the performance of tasks traditionally expected of HR through direct individual access to the Web. Additional satisfactory options for direct access comprise permitting staff to enter data on time and work, check their pension situation, manage deposits, design their contributions, construct yearly performance strategy and monitor staff information (Roberts, 1999). A Web portal provides a two-way communication channel to improve the relationship between individual employees and the broader organization.

Table 1: A Summary of HRIS Applications

HRIS Applications	Studies
1. *Recruitment & selection*	Galanaki (2002), Ngai et al. (2008), Mooney (2002), Verhoeven and Williams (2008), Junaid et al. (2010), S.C. Kundu, Rajesh Kadian (2012).
2. *Training & development*	Karakanian (2000), Teo et al. (2001), Hendrickson (2003), S.C. Kundu, Rajesh Kadian (2012).
3. *Payroll, benefits & compensation (management)*	Andrew and Satish (2000), Ngai et al. (2008), Workforce Solutions (2009).
4. *Performance appraisal*	Hansen and Deimler (2001), Adamson and Zampetti (2001), S.C. Kundu, Rajesh Kadian (2012).
5. *HR planning*	Walker (1993), Ngai et al. (2008).
6. *Internal & external communication*	Karakanian (2000), Ngai et al. (2008).
7. *Self-service, including Web portal*	O'Connell (1996), Roberts (1999), Ngai et al. (2008).

Source: Workforce Solutions (2009)

Literature Review

Studies show that HRIS applications in human resource (HR) help primarily in achieving three objectives i.e. cost reduction/efficiency gains, client service improvement/facilitating management and employees and improving the strategic orientation of HRM/innovation (Broderick and Boudreau, 1992; Ruël et al., 2004). Ruël et al. (2004) added a fourth dimension to it i.e. allowing integration of HR functions. These could be set as HRIS goals and taken as the basic reasons for adoption of HRIS in any organization.

Over the past two decades, there have been a number of studies on HRIS. These studies have focused on the type of applications that are predominant in HRIS (DeSanctis, 1986; Broderick and Boudreau, 1992; Martinsons, 1994), the contexts necessary for the successful implementation of HRIS (Yeh, 1997) as well as the conditions that support successful HRIS (Haines and Petit, 1997). Martinsons (1994) clarified the usage of HRIS as per the sophistication. He described the use of HRIS for administrative purpose i.e. in employee record-keeping, payroll, payroll benefits etc. in HR as "unsophisticated" (Martinsons, 1994). Studies have concluded that HRIS has been mostly used for these HR activities. Automation, streamlining administrative tasks, deletion of repetitive activities and the subsequent effects of these applications help HRIS to achieve the basic purpose of cost and time reduction, process automation and efficiency gains (Ball, 2001; Ruël et al., 2004; Ngai and Wat, 2006; Hussain et al., 2007; Altarawneh and Al-Shqairat, 2010).

Ball (2001) and Martinsons (1994) regarded the use of HRIS in domains of training and development, recruitment and selection in addition to HR planning and performance as being 'sophisticated'. Here, it is claimed that what plays into the improvement of employee services are: the availability of data regardless of time, minimizing data duplication as well as the betterment and streamlining of HR functions. Therefore, introducing web based HRIS shifts HR activities to managers and employees through self-service technology.

Consequently, the time spent on routine administrative tasks can now be invested in strategic issues as well as in implementing novel plans which benefit the organization. HRIS provided HR professionals with new chances to help their employees prepare career plans, and strategies related to training and development. Marler (2009) points out that the integration of HRIS applications supports the implementation of HR policies and therefore achieves the organization's strategic goals. Similarly, Kossek and her colleagues argued that a corporate human resources information system can theoretically and practically get the HR department involved as a strategic business partner. Ruel et al. (2004) went further in support of HRIS implementation to the extent that they claimed that such global presence forces organizations to use HRIS and imagining HR in multi-plant companies without web based HRIS applications is like a myth

Many studies have been carried out on various applications of HRIS (Kinnie and Arthurs, 1996; Lin, 1997; Ball, 2001; Teo et al., 2001; CedarCrestone, 2006; De Alwis, 2010; Saharan and Jafri, 2012). A study in Taiwan found that HRIS is most extensively utilized at the EDP level, followed by the MIS and DSS levels (Lin, 1997). Kinnie and Arthurs (1996) in their survey on UK companies revealed that the most frequent uses of HRIS were in operational areas of employee records (72%), payroll (66%), pensions (57%) and employment contract administration (48%). Another study found that employee record-keeping (96.8%), payroll (90.5%) and benefits management (57.1%) were the most common HRIS applications (Teo et al., 2001). Ball (2001) in a survey in UK found that current employee details and organizational salary details were the most frequently applied areas. Later, Ngai and Wat (2006) found that in Hong Kong companies the two major applications of HRIS are providing general information (86.4 %) and payroll services (84.7%). Recruitment and selection (11.1%) and succession planning (7.9%) were least used HRIS applications (Teo et al., 2001). Ngai and Wat (2006) also showed that corporate communication (20%) and recruitment and selection (26.9% and 19.1%, respectively) were least used HRIS applications. These studies show that HRIS is more commonly used for administrative purposes like employee record-keeping and payroll rather than for strategic purposes (Groe et al., 1996; Kovach and Cathcart, 1999).

However, many studies have shown that companies have started using sophisticated HRIS like training and development, performance management, compensation management and corporate communication (CedarCrestone, 2006; De Alwis, 2010; Saharan and Jafri, 2012). CedarCrestone (2006) in HCM Surveys on US companies broadened the scope of HRIS applications. Administrative HRIS was still the most popular application (62%), companies reported an increasing use of strategic applications i.e. talent acquisition services (61%), performance management (52%), or compensation management (49%) (CedarCrestone, 2006).

De Alwis (2010) in his study on Sri Lankan industry shows that the most commonly used modules in HR department are training and development, recruitment and selection and performance appraisal and are being utilized by all the companies. A recent study on Indian companies also found that HR professional had major applications of HRIS as recruitment and selection (67.2% and 71.9%, respectively), pay roll service (67.2%), providing general information (67.2%), compensation (67.2%), performance appraisal (62.5%) and job analysis and design (62.5%) (Saharan and Jafri, 2012). Also HRIS was quite in use in corporate communication (48.2%) (Saharan and Jafri, 2012). The most popular future applications of HRIS had been predicted as training and development (72.5%), career development (60.8%) and performance appraisal/management (58.8%) (Teo, et al., 2001). There appears to be a shift towards strategic applications of HRIS. The possible reason could be that most of the organizations which are using HRIS for few years till now, want to explore the possibilities of strategic HRIS applications over the next few years (Teo, et al., 2001).

Lin (1997) confirmed that there are other factors which play role in support of HRIS implementation and effectiveness, among which he mentions: higher HIRS level, usage by top managers as well as usage by HR staff and their experience. As far as the effectiveness of HRIS is concerned, the most powerful contributors are: training, support of the information systems department, the involvement of human resources leaders in addition to HR staff computer literacy. Moreover, support for decision making, timeliness, comprehensiveness and accuracy can enhance system effectiveness. In the year (2007), Teo attempted to identify the relative use of HRIS applications and its impact in Singaporean organizations. In doing so, her surveyed 500 firms, 110 of which proved usable responses which correspond to (22.2 %) of the population. The results indicated that the majority of the users do not discern the potentials of HRIS applications as only few respondents were using HRIS applications to improve their competitiveness.

Hussain et al., (2007) carried out a survey on the human resource information usage and impact which involved the 40 HR UK organizations, stating that the HRIS usage enables the HR professional to improve strategic planning. With increasing functionality and affordability, HRIS can be used widely in organizations of all sizes. However, discrepancies remain between differently sized companies and the impact of HRIS between the general professional and HR professional. They found that non-strategic benefits are accrued from deploying HRIS, especially as it reduces staffing levels for routine administrative tasks. To generate consistent and reliable data quality for auditing purposes, it was proven that small- and medium-sized companies prefer to adopt HRIS applications.

An exploratory survey of HRM practices was carried out by the Ministry of State for Public Service in Kenya (Wachira, Cotonou). This survey clarified that day-to-day HRM work in the civil service was restricted to activities like: commutation of leave, confirmation of appointments, payroll preparation, staff deployment, attending meetings, verification of personnel data, pension matters, and statutory deductions and arranging staff training. After a survey that he made, Overman (1992) presented the potential advantages of HRIS which include faster information processing, greater accuracy, improved planning, program development, and enhanced employee communications. Dileep (2010) postulated that HRIS is an integration of HRM and information systems through which HRIS helps HR managers perform HR functions in a more effective and systematic way using technology.

According to some researchers, implementing HRIS would reduce HR costs by automating information and reducing the number of needed HR employees. It also helps employees to control their own personal information and allows managers to access relevant information and data. Additionally, it also assists in conducting analyses, making decisions and communicating with others without referring to HR professionals (Awazu and Desouza 2003; Ball 2001). Ideally speaking, an appropriate implementation of HRIS applications would lead to less people needed to perform administrative tasks such a keeping records. Meanwhile, more time would become available so that HR managers can assist their employees by providing data on a strategic level.

Many of these researchers believe that the future will be bright for HRIS as it creates new paths for human resources and for the organizations that effectively use HRIS. HRIS also provides HR professionals with opportunities to enhance their contribution to the strategic direction of the firm. First, by automating and devolving many routine HR tasks to line management, HRIS provides HR professionals with the time needed to direct their attention towards more business critical and strategic level tasks, such as leadership development and talent management (Lawler et al., 2003). Second HRIS provides an opportunity for HR to play a more strategic role, through their ability to generate real time reports on HR issues, including workforce planning and skills profiles, which can be used to support strategic decision making (Hendrickson, 2003; Lengnick-Hall et al., 2003; Lawler et al., 2004).

In their 2002, HRIS survey, Watson Wyatt found that the top four metrics used in formal business cases supporting HRIS were improved productivity within HR organization, cost reductions, return on investment, and enhanced employee communications HRIS contribute to cost reductions, quality/customer satisfaction, and innovation (Broderick and Boudreau, 1992). According to Sadri and Chatterjee (2003) computerized HRIS function enable, faster decision making, development, planning, and administration of HR because data is much easier to store, update, classify, and analyze. David et al. (2010) analyzed the main traits of efficient firms and the main sources of firm's efficiency through samples of Catalan firms. Firms' efficiency shows a significant improvement when advanced ICT uses are combined with human resource practices.

Furthermore, the two sides of the equation are unequivocal. While it may be possible to pinpoint many of the relevant costs (e.g., software and hardware), it is a lot more difficult to identify the intangible benefits which can be derived from implementing HRIS systems (Boateng, 2007). In addition to cost reductions and productivity improvements, HRIS would potentially and fundamentally affect revenue channels. However, creating direct and objective benefit measures is more difficult to achieve.

On the other hand, implementing HRIS is associated with costs required as capital for all HR possibilities as well as the equipment needed by workers such as personal computers and global internet connections. Here, it is worth mentioning that some companies facilitate work-at-home by providing their employees with computer discounts to encourage home usage. Furthermore, there are inevitable transition costs associated with changing from traditional HR to HRIS. Such costs include prices of slowdowns, mistakes and other consequences of transition from legacy systems into integrated suites (Brown, 2002). On the benefits of implementing HRIS applications, Altarawneh and Al-Shqairat (2010) proposed that quick response and access to information were the major pros. On the other side, they considered the cultural and financial barriers as restricting cons.

Similarly, Batool et al. (2012) indicated that quick response and easy access to information are the benefits; they also added reducing manpower to the list. On the disadvantages, they considered lack of funds and lack of trained staff as the greatest barriers taking Accounts Office, Azad Jammu and Kashmir Community Development Programs as case studies. Here, I find it very much useful to quote Bhaskar (2011: 15) who postulated that: *"In the current fast-paced global competitive business environment, the efficient and effective management of human capital is an immense challenge to the human resources departments. Information systems contribute to improve the organizational performance, and enhance the competencies of human resources professionals"*.

Relatively, Russel and Michael (1988) and Thomas and Anne (1997) agreed that the integrations of information systems with human resources departments could lead different organizations to acquire competencies in HR management. Further, human resources systems can contribute to acquiring strategic capabilities through facilitating the decision making processes, enhancing information accuracy as well as

reducing cost and time. Regarding the relationship between the practices of human resources management and competitive advantage, a number of researchers addressed this topic.

Moreover, researchers addressed the relationship between human resource management practices and competitive advantage. Researchers have observed that human resources management can contribute to competitive advantage by reinforcing the set of role behaviour that result in low cost and product differentiation (Augustine and Mary, 1994; Carol, 1998; Zahid et al., 2007). HRIS was designed to enhance the administration, planning, control activities and decision making of HR (Carol, 1998; Russell and Michael, 1988). Thus HRIS has the ability to make human resources more competitive; consequently human resource department will be as a strategic partner in organizations (Carol, 1998; Zahid, et al, 2007). The majority of the studies have focused on the status of the use of HRIS and on the human resources practices which integrated as a part of HRIS. There has been minimum research done to address the perceived benefits of implementing HRIS (Ngai and Wat, 2004).

Lederer (1984) highlighted why he regards the accuracy and timeliness of HRIS as the most important aspect of the application process; he justified his view by showing the importance of operating, controlling, and planning of HR activities. On the advantages of using HRIS, Kovach et al. (2002) listed several administrative and strategic pros; meanwhile, we prefer to mention here the five reasons why companies should use HRIS as pointed out by Beckers and Bsat (2002). These were because HRIS can: (1) increase competitiveness by improving HR operations; (2) produce a greater number and variety of HR-related reports; (3) shift the focus of HR from the processing of transactions to strategic HRM; (4) make employees part of HRIS; and finally (5) reengineer the entire HR function of companies. Broderick and Boudreau (1992) examined how HRIS can contribute to cost reductions, quality/customer satisfaction, and innovation. Later on, Sadri and Chatterjee (2003) argued that the computerization of functions through applying HRIS led to faster decision making of matters related to the development, planning and administration of HR; this was justified by claiming that data became easily stored, updated, classified and analyzed not to mention the role that HRIS plays in strengthening the organization's character.

Kettley and Reilly reported (2003) that the potential benefits of HRIS can be divided into three areas: Operational efficiency – Reducing overhead costs, enhancing the accuracy of data, eliminating the costs of printing and disseminating information, minimizing IT infrastructure costs by moving towards a common HR service platform and enhancing the ability to distribute HR information and services globally Relational impact – Change the nature of the relationship between HR, line managers and employees. Transformational impact – Transform HR's role into that of a strategic business partner, adding greater value to the business by increasing HR's influence as customer focused consultants, enabling new, flexible and responsive methods for delivering HR services expanding HR's reach as the experts of an organization's people processes and developers of value propositions for different employee groups.

Research Hypotheses: Based upon literature review, the following hypotheses are examined in this study**:**

H01: There is no significant difference among business organizations in terms of the extent of HRIS applications being practiced based on their type of business sector

H02: There is no significant difference among business organizations in terms of the extent of HRIS applications being practiced based on their size of business

H03: There is no significant difference among business organizations in terms of the extent of HRIS applications being practiced based on their business experience

Research Methodology: The data for this research were collected through self-administrated questionnaire by including the variables used in various studies (Ball, 2001; Teo et al., 2001; Ngai and Wat, 2006; Ruël et al., 2007; Ngai et al., 2008; Al-dmour et al., 2010, 2013). The included different variables were like: HR planning, job analysis and design, training and development, disciplining procedure, performance appraisal and review, employment reward, compensation management, pay roll, current employees' information, and employment leave (Al-dmour et al., 2013); recruitment, pay roll benefit, self-service web portal and internal and external communication (as in Ngai et al., 2008); corporate communication (Ngai and Wat, 2006); historical record of employees (Ball, 2001) and strategic management (Ruël et al., 2007).

The target respondents were the shareholding companies in Jordan and the key respondent was HR manager. The survey units in this study are the individual business firms. The decision of the choice of the individual firm as a focus for study derived from the nature and the objectives of the study. In other words, the investigation was conducted at the micro level. The identification of the individual business organizations in the country (Jordan) could be done by obtaining names of all firms, as well as their addresses, from a variety of private and public sources in order to identify the type of business sector, and the range of the number of firms in each sector. Restrictions of time and financial resources could make the inclusion of all business organization impossible. Therefore, the target population is only limited to the shareholding companies listed in Amman Stock exchange Market database. Table (2) demonstrates the domain of the study's population and number of respondents by sector. Out of 275 shareholding companies, only 236 companies responded to the questionnaire. The response rate is there of (85 %) percent of the size of sample.

Table 2: Study Population by Sector

Type of Company*	No. of Companies	No. of Respondents	Percentage
Banks & Insurance	43	38	93.75
Services	154	131	85
Manufacturing	78	68	87
Total	**275**	236	85

Source:*National statistics Yearbook 2012

A total number of 275 questionnaires for the study were distributed to the respondent's by mail and also by hand. Initially, research assistants called the companies to have appointments to distribute copies of questionnaire to their companies. After respondents answered the questions, the assistants collected the copies from them. In this survey, some variables are factual (for example, type of business, size and experience), whereas others are perceptual (for instance, management expectations, commitment and corporate culture.). All perceptual variables are measured using multi-item constructs that have been previously tested. The dependent variables (i.e. the extent of the utilization of HRIS applications) and the independent variables (internal and external factors) were measured using a five-point Likert scale (e.g. ranging from (1) "not implemented at all" to (5) "highly implemented"). The study is based on primary data. For data collection, a structured questionnaire was developed collected data were fed to the statistical software called SPSS-20 to analyse. Simple statistical tools like, mean, standard deviation, and Anova were applied.

The Extent of Practice of HRIS Applications: The measure of extent of HRIS function being implemented is the type of applications used in the organization. In this study, the uses of HRIS for ten HRM activities were identified. These were selected as they were the most common applications frequently mentioned in HRIS books and HR magazines. The results are presented in Table (3). The results are consistent with previous work as many surveys and research on HRIS found that HRIS is more commonly used for administrative purposes like employee record-keeping and payroll rather than for strategic purposes (Ball 2001; Kovach et al. 2002; Ngai and Wat 2006; Hussain, et al., 2007; Delorme and Arcand 2010). The results indicate that the extent of HRIS applications being practiced could be considered moderate (i.e. 3.50%), since their means are greater than the mean of the scale*, which is 3 (i.e. mean of the scale = Σ Degrees of the scale / 5 = 1+2+3+4+5 / 5 = 3).

Table 3: Extent of Implementing of HRIS Applications

HRIS Applications	Mean*	Percentage	Standard deviation
Employee record-keeping	4.52	90.4	.701
Recruitment/selection	4.20	84	.855
Payroll service	4.10	82.	.774
Benefits management	3.75	75	,765
Training & development	4.21	84.2	.824
Performance appraisal/	3.80	76	.876
Compensation management	3.47	71.4	1.16
Turnover tracking/job analysis	3.37	67.4	.988
Internal and external communication	3.50	70	.876
Succession HR planning	3.45	69	.804
Average practice	3.50	70	.865

Testing Hypotheses: The ANOVA analysis technique is used to examine the study hypotheses. To assess the differences among business organizations in terms of the practice of HRIS applications based on their organization's demographic characteristics such as size, type of business, and business experience (age), one way analysis of variance (ANOVA) was used to compare the means of participants' extent of practice of HRIS applications and determine if there are any significant differences among the three types of business sectors , i.e., banks and insurance, service and industrial . As it is shown in Table (4), there are significant differences among business originations in terms of the practice of HRIS applications due to their types of business sector to which they belong.

Table (4): The level of significance of HRIS applications among groups of organizations based upon their business experience

HRIS applications		Sum of Squares	Df	Mean Square	F	Sig.
Employee recordkeeping.	Between Groups	53.155	2	26.577	14.367	.000
	Within Groups	431.015	233	1.850		
	Total	484.169	235			
Recruitment and selection.	Between Groups	31.088	2	15.544	8.026	.000
	Within Groups	451.263	233	1.937		
	Total	482.352	235			
Payroll service	Between Groups	47.943	2	23.972	12.535	.000
	Within Groups	445.599	233	1.912		
	Total	493.542	235			
Benefits management	Between Groups	56.659	2	28.330	15.770	.000
	Within Groups	418.561	233	1.796		
	Total	475.220	235			
Training and development	Between Groups	48.711	2	24.356	13.633	.000
	Within Groups	416.251	233	1.786		
	Total	464.962	235			
Performance appraisal	Between Groups	52.237	2	26.119	16.370	.000
	Within Groups	371.746	233	1.595		
	Total	423.983	235			
Compensation management	Between Groups	57.790	2	28.895	17.103	.000
	Within Groups	393.646	233	1.689		
	Total	451.436	235			
Turnover tracking/analysis.	Between Groups	49.766	2	24.883	16.323	.000
	Within Groups	355.183	233	1.524		
	Total	404.949	235			
Internal and external communication	Between Groups	58.079	2	29.040	19.191	.000
	Within Groups	352.578	233	1.513		
	Total	410.657	235			
Succession HR planning.	Between Groups	69.633	2	34.817	19.273	.000
	Within Groups	420.922	233	1.807		
	Total	490.555	235			

ANOVA test is also used to measure the differences among the business originations in terms of the extent of practice of HRIS applications based on their size (number of employees. The results shown in Table (5) indicate there are no significant differences among business organizations in terms of the extent of the practice of HRIS applications due to their size. This result suggests that the business organization were not varied in the extent of use of the HRIS applications.

Table (5): The level of significance of HRIS applications among groups of organizations based upon their Size

HRIS applications		Sum of Squares	df	Mean Square	F	Sig.
Employee recordkeeping.	Between Groups	4.377	2	2.189	1.063	.347
	Within Groups	479.792	233	2.059		
	Total	484.169	235			
Recruitment and selection.	Between Groups	6.172	2	3.086	1.510	.223
	Within Groups	476.180	233	2.044		
	Total	482.352	235			
Payroll service	Between Groups	5.599	2	2.799	1.337	.265
	Within Groups	487.944	233	2.094		
	Total	493.542	235			
Benefits management	Between Groups	8.469	2	4.234	2.114	.123
	Within Groups	466.752	233	2.003		
	Total	475.220	235			
Training and development	Between Groups	4.177	2	2.089	1.056	.349
	Within Groups	460.785	233	1.978		
	Total	464.962	235			
Performance appraisal	Between Groups	4.790	2	2.395	1.331	.266
	Within Groups	419.193	233	1.799		
	Total	423.983	235			
Compensation management	Between Groups	3.036	2	1.518	.789	.456
	Within Groups	448.401	233	1.924		
	Total	451.436	235			
Turnover tracking/analysis.	Between Groups	4.484	2	2.242	1.305	.273
	Within Groups	400.465	233	1.719		
	Total	404.949	235			
Internal and external communication	Between Groups	4.445	2	2.222	1.275	.281
	Within Groups	406.212	233	1.743		
	Total	410.657	235			
Succession HR planning.	Between Groups	2.604	2	1.302	.622	.538
	Within Groups	487.951	233	2.094		
	Total	490.555	235			

Furthermore, ANOVA test is employed to examine the difference among the business organizations in terms of the extent of use of HRIS applications based on their business experience (age). The result revealed in Table (6) that there are significant differences among business organizations in terms of the practice of HRIS applications due to their business experiences.

Table (6): The level of significance of HRIS applications among groups of organizations based upon their business experience

HRIS applications		Sum of Squares	Df	Mean Square	F	Sig.
Employee recordkeeping.	Between Groups	19.423	2	9.711	4.869	.008
	Within Groups	464.747	233	1.995		
	Total	484.169	235			
Recruitment and selection.	Between Groups	15.154	2	7.577	3.779	.024
	Within Groups	467.197	233	2.005		
	Total	482.352	235			
Payroll service	Between Groups	22.867	2	11.433	5.660	.004
	Within Groups	470.676	233	2.020		
	Total	493.542	235			
Benefits management	Between Groups	21.130	2	10.565	5.421	.005
	Within Groups	454.090	233	1.949		
	Total	475.220	235			
Training and development	Between Groups	19.088	2	9.544	4.987	.008
	Within Groups	445.874	233	1.914		
	Total	464.962	235			
Performance appraisal	Between Groups	14.962	2	7.481	4.261	.015
	Within Groups	409.021	233	1.755		
	Total	423.983	235			
Compensation management	Between Groups	19.164	2	9.582	5.165	.006
	Within Groups	432.272	233	1.855		
	Total	451.436	235			
Turnover tracking/analysis.	Between Groups	12.759	2	6.380	3.790	.024
	Within Groups	392.190	233	1.683		
	Total	404.949	235			
Internal and external communication	Between Groups	14.641	2	7.320	4.307	.015
	Within Groups	396.016	233	1.700		
	Total	410.657	235			
Succession HR planning.	Between Groups	26.691	2	13.346	6.703	.001
	Within Groups	463.864	233	1.991		
	Total	490.555	235			

Discussion and Conclusions

One of the main objective of this study is to explore to which extent the business organizations in Jordan applied HRIS applications. The results indicate that the extent of HRIS being practiced is considered to be moderate (i.e. 70% or 3.51%). This implies that there are some variations among business organisations in terms of their level of implementing HRIS applications. This might be due to the fact that some of the managements of these business organisations would prefer to use these applications for administrative rather than strategic purposes. This result is consistent with previous work, as many surveys on HRIS have found that HRIS is more commonly used for administrative purposes like employee record-keeping and payroll rather than for strategic purposes (Ngai and Wat, 2006; Ball, 2001; Kovach, et al., 2002 ; Hussain et al., 2007; Delorme and Arcand, 2010; Masum, et al., 2013). In this context, Ball (2001), Kovach et al. (2002), and Ngai and Wat (2006) argue that HRIS should not only be designed to automate HRM activities to gain administrative advantages; rather, it should also be used for decision-making and providing strategic advantages for organisations.

However, Kundu and Kadian (2012) reported that many studies have shown that companies have started using sophisticated HRIS applications for training and development, performance management, compensation management and corporate communication (CedarCrestone, 2006; De Alwis, 2010; Saharan and

Jafri, 2012; Masum, et al. 2013). CedarCrestone (2006) in HCM Surveys on US companies broadened the scope of HRIS applications. Administrative HRIS was still the most popular application (62%), and companies reported an increasing use of strategic applications, including for talent acquisition services (61%), performance management (52%) and compensation management (49%) (CedarCrestone, 2009). De Alwis (2010) in his study on Sri Lankan industry shows that the most commonly used modules in HR department are training and development, recruitment and selection, and performance appraisal, which were being utilized by all the companies in the sample.

The second objective of the study is to compare differences among business organizations in terms of the extent of HRIS being practiced based on their type of business, size and experience. Interestingly, the study found no significant differences among business organizations in the extent of HRIS being practice due to their size. One explanation for this is that all of business originations in this study are shareholding companies. That is to say, all of them were large organizations. However, statistical significant differences were found based on the type of business sector as well as the length of time in business (experience). It was found that the extents of HRIS applications being used are varied among business organizations either due to their type of business or experience.

One explanations of the above findings is that regardless the size of business organizations, there are many other classifying variables that make Jordanian business different in terms of the extent of HRIS application being implemented such as the business' experience (age) and type of business. The results revealed that the business organizations were varied in all the HRIS applications. This result is consistent with the previous studies such (CedarCrestone, 2006; De Alwis, 2010; Saharan and Jafri, 2012).

Based on the above discussed findings, two outstanding conclusions can be made. First, the results indicate that the extent of HRIS being practiced is considered to be moderate. The results also indicate that the most frequent application of HRIS in business organizations in Jordan was found to be in "employee record", followed by "payroll" and "recruitment/selection". Sophisticated HRIS applications such as "Succession Planning", "Performance Appraisal", "Compensation Management" and "Training and Development" were also applied in organizations in Jordan. This could be because HRIS applications have been deployed since the inception of HRM in Jordan. From the 1960s, personnel management was closely involved in office automation in pay roll, benefit administration and other transaction processing applications such as employee record holding (Martinsons 1994, Ball, 2001). The study concludes that the scope of HRIS applications have broadened in Jordan. Although operating HRIS applications like employee record and payroll remain the most popular applications, there is an increase in use of HRIS in sophisticated activities and decision making. Previous studies support these findings (CedarCrestone, 2006; Saharan and Jafri, 2012).

Second, when compared, the extent of HRIS application being practiced among business organizations in terms of type of business (banks, insurance, and service companies vs. industrial companies) was found at a significant edge over industrial companies on all the ten applications. This clearly indicated that the service companies apply more of HRIS applications than the industrial companies. This might be due to the fact that service companies tend to be more technology-oriented and driven than industrial companies in Jordan. However, there are no significant differences in the use of HRIS applications among business organizations due to their size.

The present study has important implications for studies aimed to understanding HRIS implementation in developing countries. However, explanations of several findings above indicate the importance of contextual factors within organisations. This study provides some insights into the implementation of HRIS by Jordanian shareholding companies, which should help HR practitioners to acquire a better understanding of the current HRIS implementation status and applications.

References

Adamson, L. and Zampetti, R. (2001). "Web-based manager self-service: adding value to the work", *Web-based Human Resources,* pp. 24-35.

Altaf, A., Agha, A., Holte-McKinzie, M., Abbas, Q., Jafri, S.B., Emmanuel, F., Bridges, J., Searle, S., Selck, F. and Martinson, N. (2012). "Size estimation HIV prevalence and risk behaviours of female sex workers in Pakistan", *JPMA.Journal of the Pakistan Medical Association,* vol. 62, no. 6, pp. 551-557.

Al-Dmour, R.H. and Shannak, R.O. (2012). "Determinants of the Implementation Level Of Electronic Human Resources Management (E-HRM) In Jordanian Shareholding Companies", *European Scientific Journal,* vol. 8, no. 17.

Anderson, A., Proudfoot, J.G. and Harris, M. (2009). "Medical assistants: A primary care workforce solution?", *Australian Family Physician,* vol. 38, no. 8, pp. 623.

Awazu, Yukika, and Desouza, Kevin C. (2003). Knowledge Management. *HR Magazine,* vol. 48, no. 11, pp. 107-112.

Ball, K.S. (2001). "The use of human resource information systems: a survey", *Personnel Review,* vol. 30, no. 6,

pp. 677-693.

Batool, A., and Batool, B. (2012). Effects of employees training on the organizational competitive advantage: Empirical study of Private Sector of Islamabad, Pakistan. *Far East Journal of Psychology & Business,* vol. 6, no.1.

Bauer, E. D., Altarawneh, M. M., Tobash, P. H., Gofryk, K., Ayala-Valenzuela, O. E., Mitchell, J. N., and Thompson, J. D. (2012). Localized 5f electrons in superconducting PuCoIn5: consequences for superconductivity in PuCoGa5. J*ournal of Physics: Condensed Matter,* vol. 24, no. 5.

Beckers, A.M. and Bsat, M.Z. (2002). "A DSS classification model for research in human resource information systems", *Information Systems Management,* vol. 19, no. 3, pp. 1-10.

Belcourt, M., Bohlander, G. W., Snell, S., and Sherman, A. (2011). Managing human resources. Nelson Education.

Boateng, A. A. (2007). The role of human resource information systems (HRIS) in strategic human resource management (SHRM). Master of Science Theses, Accounting Swedish School of Economics and Business Administration, Palovartijantie

CedarCrestone (2009). CedarCrestone 2009-2010 HR Systems Survey: HR Technologies, Deployment Approaches, Value, and Metrics, 12th annual ed., CedarCrestone, Alpharetta, GA, available at: www.cedarcrestone.com/research.php (accessed September 30, 2009).

Chalmeta, R., and Pazos, V. (2015). "A step-by-step methodology for enterprise interoperability projects", *Enterprise Information Systems,* vol. 9, no. 4, pp. 436-464.

Clark, T., Grant, D. and Heijltjes, M. (1999) "Researching comparative and international human resource management: key challenges and contributions", International Studies of Management & Organisation, vol. 29, no. 4, pp. 6-23.

David, J., Jelf, G., and Brandes, D. (2010). "Human resource information systems: perational issues and strategic considerations in a global environment", International Journal of Human Resource Management, vol. 7, no. 1, pp. 245-269.

De Alwis, A.C. (2010). "The impact of electronic human resource management on the role of human resource managers", *E M Ekonomie a Management,* vol. 4, pp. 47-60.

Delorme, M. and Arcand, M. (2010). "HRIS implementation and deployment: A conceptual framework of the new roles, responsibilities and competences for HR professionals", *International Journal of Business Information Systems,* vol. 5, no. 2, pp. 148-161.

DeSanctis, G. (1986). "Human resource information systems: A current assessment", *MIS Quarterly, ,* pp. 15-27.

Desouza, K. C., and Awazu, Y. (2003). Constructing internal knowledge markets: considerations from mini cases. International Journal of Information Management, 23(4), 345-353.

Dileep, A. (2010). Enterprise resource planning: the emerging organizational value systems. Industrial Management & Data Systems, April, 2000, vol. 100, no. 3, pp. 114-118.

Ensher, E.A., Nielson, T.R. and Grant-Vallone, E. (2002). "Effects of the internet and technology on HR processes", *Organisational dynamics,* vol. 31, no. 3, pp. 224-244.

Fagan, J., and Ployhart, R. (2015). "The information processing foundations of human capital resources: Leveraging insights from information processing approaches to intelligence", *Human Resource Management Review,* vol. 25, no. 1, pp. 4-11.

Florkowski, G.W. and Olivas-Luján, M.R. (2006). "The diffusion of human-resource information-technology innovations in US and non-US firms", *Personnel Review,* vol. 35, no. 6, pp. 684-710.

Galanaki, E. (2002). "The decision to recruit online: A descriptive study", *Career Development International,* vol. 7, no. 4, pp. 243-251.

Haines, V.Y. and Petit, A. (1997). "Conditions for successful human resource information systems", *Human Resource Management,* vol. 36, no. 2, pp. 261-275.

Hansen, M.T. and Deimler, M.S. (2001). "Cutting costs while improving morale with B2E management", *MIT Sloan Management Review,* vol. 43, no. 1, pp. 96-100.

Hendrickson, A.R. (2003). "Human resource information systems: Backbone technology of contemporary human resources", *Journal of Labor Research,* vol. 24, no. 3, pp. 382-394.

Hussain, Z., Wallace, J. and Cornelius, N.E. (2007). "The use and impact of human resource information systems on human resource management professionals", *Information & Management,* vol. 44, no. 1, pp. 74-89.

Jain, A. (2014). "Study on effectiveness of human resource information system at Vistaar Technologies (Mumbai)", *SIES Journal of Management*, vol. 10, no. 2, pp. 63-78.

Junaid, Z., Muhammad, S. and Norazuwa, M. (2010). "An analysis of e-human resource management practices: A case study of State Bank of Pakistan", *European Journal of Social Sciences,* vol. 15, no. 1, pp. 18-26.

Karakanian, M. (2000). "Are human resources departments ready for e-HR?", *Information Systems Management,* vol. 17, no. 4, pp. 1-5.

Kettley, P., and Reilly, P. (2003). " eHR: An introduction", Institute for Employment Studies, Report 398, University of Sussex, United Kingdom.

Kinnie, N. J., and Arthurs, A. J. (1996). Personnel specialists' advanced use of information technology evidence and explanations. *Personnel Review,* vol. 25, no. 3, pp. 3-19.

Kirrane, D.E. (1990). "Managing values: A systematic approach to business ethics", *Training and Development Journal.*

Kovach, K.A., Hughes, A.A., Fagan, P. and Maggitti, P.G. (2002). "Administrative and strategic advantages of HRIS", *Employment Relations Today,* vol. 29, no. 2, pp. 43-48.

Krishna, C. and Bhaskar, S.V. (2011). "Assessment of support and benefits of HRIS in medium-scale textile industries", *International Journal of Research in Economics & Social Sciences,* vol. 1, no. 2, pp. 48-57.

Kundu, S. and Kadian, R. (2012). "Applications of HRIS in human resource management in India: A study", *European Journal of Business and Management,* vol. 4, no. 21, pp. 34-41.

Lau, G. and Hooper, V. (2008). "Adoption of e-HRM in large New Zealand organisations", *Encyclopedia of Human Resource Information Systems,* pp. 31-41.

Lengnick-Hall, M.L. and Moritz, S. (2003). "The impact of e-HR on the human resource management function", *Journal of Labor Research,* vol. 24, no. 3, pp. 365-379.

Lin, C.Y.Y. (1997). "Human resource information systems: Implementation in Taiwan", *Research and Practice in Human Resource Management,* vol. 5, no. 1, pp. 57-72.

Lizcano, D., Alonso, F., Soriano, J. and López, G. (2016). "Web-centred end-user component modelling", Future Generation Computer Systems, vol. 54, pp. 16-40.

Marler, J.H., Fisher, S.L. and Ke, W. (2009). "Employee self-service technology acceptance: A comparison of pre-implementation and post-implementation relationships", *Personnel Psychology,* vol. 62, no. 2, pp. 327-358.

Martinsons, M. G. (1994). Benchmarking human resource information systems in Canada and Hong Kong. *Information & Management,* vol. 26, no. 6, pp. 305-316.

Masa'deh, R. (2013). "The Impact of information technology infrastructure flexibility on firm performance: An empirical study of Jordanian public shareholding firms", *Jordan Journal of Business Administration,* vol. 9, no. 1, pp. 204-224.

Masa'deh, R., Tarhini, A., Al-Dmour, R., and Obeidat, B. (2015). "Strategic IT-business alignment as managers' exploitative strategies", *European Scientific Journal,* vol. 11, no. 7, pp. 344-368.

Masum, H., Rao, A., Good, B.M., Todd, M.H., Edwards, A.M., Chan, L., Bunin, B.A., Su, A.I., Thomas, Z. and Bourne, P.E. (2013). "Ten Simple Rules for Cultivating Open Science and Collaborative R&D", *PLoS Computational Biology,* vol. 9, no. 9.

Meade, J. (2000). "Web-based HRIS meets multiple needs", *HR Magazine,* vol. 45, no. 8, pp. 129-131.

Mohrman, S., Lawler, E. and McMahon, G. (1996). "New directions for the human resources organisation", *Los Angeles: Center for Effective Organisations, University of Southern California.*

Moon, K. and Ngai, E. (2008). "The adoption of RFID in fashion retailing: A business value-added framework", *Industrial Management & Data Systems,* vol. 108, no. 5, pp. 596-612.

Mooney, J. (2002). "Pre-employment testing on the Internet: Put candidates a click away and hire at modem speed", *Public Personnel Management,* vol. 31, no. 1, pp. 41-52.

Ngai, E. and Wat, F. (2006). "Human resource information systems: A review and empirical analysis", *Personnel Review,* vol. 35, no. 3, pp. 297-314.

Ngai, E. and Wat, F. (2004). "Dominance approach to risk analysis of computer systems", *Decision Support Systems,* vol. 37, no. 4, pp. 485-500.

O'Connell, S. (1996). "Virtual HR: An economic reality", *HR Magazine,* vol. 41, pp. 37-42.

Obeidat, B., Masa'deh, R., and Abdallah, A. (2014). "The relationships among human resource management practices, organizational commitment, and knowledge management processes: A structural equation modeling approach", *International Journal of Business and Management,* vol. 9, no. 3, pp. 9-26.

Oliveira, T. and Martins, M.F. (2011). "Literature review of information technology adoption models at firm level", *The Electronic Journal Information Systems Evaluation,* vol. 14, no. 1, pp. 110-121.

Overman, S. (1992). "Reaching for the 21st Century", *HR Magazine,* vol. 37, pp. 61-63.

Panayotopoulou, L., Vakola, M. and Galanaki, E. (2007). "E-HR adoption and the role of HRM: Evidence from Greece", *Personnel Review,* vol. 36, no. 2, pp. 277-294.

Premkumar, G. and Roberts, M. (1999). "Adoption of new information technologies in rural small businesses", *Omega,* vol. 27, no. 4, pp. 467-484.

Ruël, H., Bondarouk, T. and Looise, J.K. (2004). "E-HRM: Innovation or irritation: An explorative empirical study in five large companies on web-based HRM", *Management Revue,* vol. 15, no. 3, pp. 364-380.

Rynes, S. L., Colbert, A. E., and Brown, K. G. (2002). HR professionals' beliefs about effective human resource practices: Correspondence between research and practice. *Human Resource Management,* vol. 41, no.

2, pp. 149-174.

Sadri, J., and Chatterjee, V. (2003). Building organisational character through HRIS. International *Journal of Human Resources Development and Management,* vol. 3, no. 1, pp. 84-98.

Strohmeier, S. (2007). "Research in e-HRM: Review and implications", *Human Resource Management Review,* vol. 17, no. 1, pp. 19-37.

Teo, T.S.H. (2007). "Organisational characteristics, modes of internet adoption and their impact: A Singapore perspective", *Journal of Global Information Management (JGIM),* vol. 15, no. 2, pp. 91-117.

Teo, T.S.H., Soon, L.G. and Fedric, S.A. (2001). "Adoption and impact of human resource information systems (HRIS)", *Research and Practice in Human Resource Management,* vol. 9, no. 1, pp. 101-117.

Verhoeven, H. and Williams, S. (2008). "Advantages and disadvantages of Internet recruiting: A UK study into employers' perceptions", *International Review of Business Research Papers,* vol. 4, no. 1, pp. 364-373.

Walker, A.J. (1993). *Handbook of human resource information systems: Reshaping the human resource function with technology,* McGraw-Hill, Inc.

Zahid, H., W. James, and Nelarine, E.C. (2007). "The use and impact of human resource information systems on human resource management professionals", Information & Management, vol. 44, no. 1, pp. 74-89.