A THEORETICAL REVIEW ON HRIS IMPLEMENTATION PRACTICES IN INDIA: A HR LEADERSHIP PERSPECTIVE

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Abstract: An integrated HRIS is a database shared by all HR functions that provide common language and integrates all HR services. A data base nuclear containing information about the competency is required of jobs and competencies of people by all HR functions. HRIS has increasingly transformed since it was first introduced at General Electric in the 1950s. HRIS has gone from a basic process to convert manual information-keeping systems into computerized systems. Because of the complexity and data intensiveness of the HRM function, it is one of the last management functions to be targeted for automation (Bussler & Davis, 2001/2002). This fact does not mean that HRIS is not important, it just indicates the difficulty of developing and implementing it compared with other business functions (e.g., billing and accounting system). Powered by information system and Internet, almost every process in the every function of HRM has been computerized today.

Key Words: HRIS; Information; HR Information; Human Resources; Payroll; Time and Allowances; Recruiting; Learning Management System; Integrated

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Objectives of the Study:

(i) To understand and analyse the funtional areas of developments of HRIS in India

(ii) To understand the applications of HRIS in India

(iii) To understand the architecture of HRIS system

(iv) The advantages and Disadvantages of using HRIS

(v) To evaluate the developments in the technology related to HRIS

Methodology: An exploratory study with the available literature study and other research resources to compile on the data available.

Data: Secondary data and Literature sources and Review of related literature studies

Review of Literature

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 recordkeeping, 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.

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 .

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.

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.

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.

Wazu 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).

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).

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).

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.

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".

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.

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.

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.

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.

Introduction: 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. The human resource management (HRM) system has encountered frequent and numerous innovations in technology. It includes the human resource information system (HRIS), electronic human resource management (e-HRM) and virtual human resource management (VHRM) (Ngai et al., 2008). Tannenbaum (1990) defined human resource information system (HRIS) as "one which is used to acquire, store, manipulate, analyze, retrieve, and distribute information about an organization's human resource". Later HRIS was also defined as "the composite of databases, computer applications, and hardware and software necessary to collect/record, store, manage, deliver, present, and manipulate data for human resources" (Broderick and Boudreau, 1992). Beginning with 1960s, personnel management has been an early candidate of HRIS with office automation in payroll, benefit administration and other transaction processing applications such as employee record holding (Ball, 2001; Martinsons, 1994). Also, availability of low cost, generic, flexible, easy to install and easily customizable window based products helped smaller software houses in writing affordable, easily customizable, modular HRISs with better sophisticated reporting capabilities (Ball, 2001). This led individuals and organizations preferring use of computers and net based technologies in HRIS. In 1990s, the expectations were how HRIS can contribute in organization's HR strategic activities and help in business planning. Managements feel that computer based HRIS can offer the real solution for retention of critical human resource and its development. With an HRIS, the human resource department can effortlessly manage employee data, whenever required supplementing it with computer and web-based technology, allowing them to reallocate their energies towards more important HR activities like implementing policies to achieve organization goals. Martinsons (1994) pointed out that HRIS is normally used for two different purposes. One for simple automation like payroll and benefits administration, and keeping the employee records electronically for administrative purpose to reduce costs and time.

Leading management thinkers suggested that, "It is not technology, but the art of human and humane management" that is continuing challenge for executives in the 21st century (Drucker,

Dyson, Handy, Saffo, & Senge, 1997). Similarly, Smith and Kelly (1997) believed that future economic and strategic advantage will rest with the organizations that can most effectively attract, develop, and retain diverse group of the best and the brightest human talent in the market place. Many HR (human resource) executives and managers are so busy taking care of their daily duties, which are generally administrative, that they neglect to consider important issues that are coming down the road. This is a trap that any department can fall into, but it can be especially devastating for HR, which must battle decades of preconceived notions about the department's ability to contribute to corporate planning. Thus, today with an increase in the number of organizations, HR is now viewed as a source of competitive advantage (Michael et al., 2012). Currently, HRMS encompass: (1) payroll; (2) time and attendance; (3) appraisal performance; (4) benefits administration; (5) HR management information system; (6) recruiting; (7) learning management; (8) training system; (9) performance record; (10) employee self-service; (11) scheduling; (12) absence management. The design, selection, and use of HRIS are contestation as a range of meanings that are attached to the technology that either undermine or highlight its perceived value and significance and which impact on the extent to which it is to be used in a strategic or more administrative fashion. Recent debates about technology and organization have highlighted the importance of social context and sought to develop frameworks which acknowledge both the material and social character of technologies including HRIS (Dery, Hall, & Wailes, 2006). Accordingly, theories which can be considered as "social constructivist" can play an important role in the study of technology as they explicitly recognize that technologies, such as HRIS, cannot be evaluated and analyzed without having an explicit understanding of the context of individuals and groups which consequently

Objective (i) : To understand and analyse the funtional areas of developments of HRIS in India: HRIS provides information and guidelines for the operation of HR functions, HRM is still a caretaker of employee records, however, the existence of an HRIS makes this information readily available and useful for managerial decision making. The system is able to produce more effective and faster outcome than that can be done on papers. HRIS can acquire and track almost any type of data. Some of the effects of HRIS are that it has brought about an improvement in the overall HR functions of the organization not only in administration work. HRIS can be one of the powerful levels of change for the HR Department in any organization. The study shows that the

system is sometimes complicated and difficult to work, but it has helped to align the HR practices with the organizational strategy, identify improvement areas, and keep abreast with the current practices. It allows an organization to assess and evaluate any gaps or potential risks and increase the commitment of HR professionals to continuous improvement. On the whole, HRIS, increases the efficiency of HR function, has helped to contribute the potentials of HR Department towards the organization, developed the structure, payroll, time, and attendance, appraisal performance, recruiting, learning management, training system, performance record, employee self-service, scheduling, absence management, systems, styles, reduced HR cost, increased motivation of the HR personnel, analyzed the problems and solved them smoothly, provided and developed sound performance appraisal systems, systematic job analysis, and smooth adoption of the changing mind-set. A follow-up study can be done to see if more organizations have adopted HRIS, if the extent of HRIS adoption is greater or if the HRIS is used for more strategic purposes. By making the HRIS a part of the organization, the HR Department can transform itself to be a strategic business partner.

Uses of HRIS: The main purpose of maintaining HRIS system is to gather, classify, process, record and disseminates the information required for efficient and effective management of human resources in the organisation.The various uses of HRIS in an organisation can be listed as follows:Personnel Administration:It encompasses personal information of an employee. These may include name, address, date of birth, marital status, and the date of joining the organisation. It also contains the name and address of next kin of the employee concern. These information describe the employee.Salary Administration:One of the functions of HRIS is to provide a report containing information like present salary, benefits, last pay increase and proposed increase in future.Leave/Absence Increase:HRIS is also used to control leave/absence of employees. This is done by maintaining a leave history of each employee. Every employee can be issued an identity card writing every employee's token number coded on it. Employee's entry and exit from the organisation should be recorded on the identity card. This reduces chances for malpractice or oversight in calculating wages for each employee.Skill Inventory:Recording employee skills and monitoring a skill data base is yet another use of the HRIS. Such a skill record helps identify employees with the necessary skill for certain positions or jobs in an organisation.Medical History:The HRIS is also used to maintain occupational health data required for industrial safety

purposes, accident monitoring, and so on.Performance Appraisal:In order to form a comprehensive overview about an employee, HRIS maintains performance appraisal data such as the due date of the appraisal, potential for promotion, scores of each performance criteria and alike. The textual information can be combined with the factual data obtained from the HRIS and the combination of information can be used for imparting training and affecting employee mobility in the form of transfer and promotion.Manpower Planning:HRIS is used for manpower planning also. It keeps information of organisational requirements in terms of positions. HRIS connects employees to the required positions in the organisation. It is also used to identify vacancies and establish employees thereon. HRIS can also help identify a logical progression path and the steps to be taken for employee progress/ advancement.Recruitment:Recruitment forms the most essential function of HRM. HRIS helps in the recruitment process in a big way by recording the details of activities involved in employee recruitment. These may include cost and method of recruitment and time taken to fill the positions level wise, for example.Career Planning:By providing necessary information such as which employees have been earmarked for which positions, HRIS facilitates positional advancement of employees. In other words, HRIS helps in planning for succession.Collective Bargaining:HRIS through a computer terminal can provide up-to-date relevant and required information, facts and figures and, thus, can facilitate collective bargaining. It can he p collective bargaining as "what if analysis" rather as feelings and fictions. In the same manner, HRIS can also help maintain better human relations in the organisation.

Objective(ii) To understand the Industrial applications of HRIS in India

The function of human resources (HR) departments is administrative and common to all organizations. Organizations may have formalized selection, evaluation, and payroll processes. Management of "human capital" progressed to an imperative and complex process. The HR function consists of tracking existing employee data which traditionally includes personal histories, skills, capabilities, accomplishments and salary. To reduce the manual workload of these administrative activities, organizations began to electronically automate many of these processes by introducing specialized human resource management systems. HR executives rely on internal or external IT professionals to develop and maintain an integrated HRMS. Before client–server architectures evolved in the late 1980s, many HR automation processes

were relegated to mainframe computers that could handle large amounts of data transactions. In consequence of the high capital investment necessary to buy or program proprietary software, these internally developed HRMS were limited to organizations that possessed a large amount of capital. The advent of client–server, application service provider, and software as a service (SaaS) or human resource management systems enabled higher administrative control of such systems. Currently human resource management systems encompass:Retaining,Hiring, Administration,Managing,HR planning,Recruiting/Learning   management,Performance record,Employee self-service, Scheduling, Absence management, Analytics, Employee Reassign module,Grievance handling by following precedents. The **payroll module** automates the pay process by gathering data on employee time and attendance, calculating various deductions and taxes, and generating periodic pay cheques and employee tax reports. Data is generally fed from the human resources and time keeping modules to calculate automatic deposit and manual cheque writing capabilities. This module can encompass all employee-related transactions as well as integrate with existing financial management systems.The **time and attendance module** gathers standardized time and work related efforts. The most advanced modules provide broad flexibility in data collection methods, labor distribution capabilities and data analysis features. Cost analysis and efficiency metrics are the primary functions.The **benefits administration module** provides a system for organizations to administer and track employee participation in benefits programs. These typically encompass insurance, compensation, profit sharing and retirement.The **HR management module** is a component covering many other HR aspects from application to retirement. The system records basic demographic and address data, selection, training and development, capabilities and skills management, compensation planning records and other related activities. Leading edge systems provide the ability to "read" applications and enter relevant data to applicable database fields, notify employers and provide position management and position control. Human resource management function involves the recruitment, placement, evaluation, compensation and development of the employees of an organization. Initially, businesses used computer-based information systems to:produce pay checks   and   payroll   reports;maintain   personnel   records;pursue talent management.Online **recruiting** has become one of the primary methods employed by HR departments to garner potential candidates for available positions within an organization. Talent management   systems typically   encompass:analyzing   personnel   usage   within   an

organization;identifying potential applicants;recruiting through company-facing listings;recruiting through online recruiting sites or publications that market to both recruiters and applicants.The significant cost incurred in maintaining an organized recruitment effort, cross-posting within and across general or industry-specific job boards and maintaining a competitive exposure of availabilities has given rise to the development of a dedicated applicant tracking system, or 'ATS', module.The **training module** 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 which 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's allow managers to approve training, budgets and calendars alongside performance management and appraisal metrics.The **employee self-service module** allows employees to query HR related data and perform some HR transactions over the system. Employees may query their attendance record from the system without asking the information from HR personnel. The module also lets supervisors approve O.T. requests from their subordinates through the system without overloading the task on HR department.Many organizations have gone beyond the traditional functions and developed human resource management 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. The **Analytics** module enables organizations to extend the value of an HRMS implementation by extracting HR related data for use with other business intelligence platforms. For example, organizations combine HR metrics with other business data to identify trends and anomalies in headcount in order to better predict the impact of employee turnover on future output.There are now many types of **Human Resources Management System (HRMS)** or **Human Resources Information System (HRIS)** some of which are typically local-machine-based software packages; the other main type is an online cloud-based system which can be accessed via a web browser.The **Staff Training Module** enables organizations the ability to enter, track and manage employee and staff training. Each type of activity can be recorded together with the additional data. The performance of each employee or staff member is then

stored and can be accessed via the **Analytics** module.Employee Re-Assign module is a recent additional functionality of HRMS. This module has the functions of Transfer, Promotion, Pay revision, Re-designation, Deputation, Confirmation, Pay mode change and Letter Formats

(iii) To understand the architecture of HRIS system; HRIS Architecture of the early days of HR applications (in the 1970s), mainframe computers built by International Business Machines (IBM). These large systems hosted payroll applications for most enterprises. Users of the system, which mainly consisted of IT personnel and HRMS (human resource management system) administrators, executed large batch processes while directly logged onto the mainframe computer. Although access to the mainframe could be done via a desktop monitor, no processing was done locally. This architecture is commonly called a single-tier computing system—user interface, application processing, and data storage resided on the mainframe. During the 1980s, it was discovered that many typical HR functions (such as employee benefits and recruiting) did not require the high-powered and expensive processing available on the mainframe computers. With the advent of the personal computer (PC), many of these functions could be reallocated to the local processingpower of the PC. By the end of the decade, HRIS software vendors such as PeopleSoft began using this power of PCs and created the client-server architecture. The purpose of client-server architecture was to spread out low-powered processing capability to the dozens of PCs now being used across an organization. High-performance applications such as Payroll would still be run in a batch process on the mainframe computer or outsourced to vendors such as Automated Data Processing (ADP). But day-to-day processing could be implemented on the PC. In this case, an HR application's logic or set of business rules would run on the local machine. Issues such as having valid data entries for hiring dates, home addresses, and name formats would be checked instantly by the PC, that is, without looking up the business rule at the server on the mainframe. Even more complex checks such as term of employment and salary deduction calculations could be done on the local PC. In addition, software applications could apply the more graphics-oriented user interface of the Windows environment. Ease of computer usage was a major factor that enabled individuals with a relatively low level of technology experience to use the applications.

Two-Tier Architecture (Client-Server) This meant that the HR software application technology could be divorced from the database technology. This separation simplified the HR application and allowed enterprises to select the most appropriate database management system (DBMS) for their needs.) The most common database design is the relational model. This model standardizes how data are physically stored on the computer and provides standard data access via the Structured Query Language (SQL). In fact, most software products are able to communicate to a variety of DBMS servers. This 2-tier architecture was a huge leap forward in allowing HR professionals to serve many more employees—data were still located in a centralized database, but logic could be distributed to the PC that needed to run the specific application, and thus usability of the HRIS increased!

Three-Tier Architecture Throughout the 1990s and into the current decade, this division of processing activity expanded from 2-tier to 3-tier and, finally, N-tier architectures. With a 3-tier architecture, the servers have two roles—as database (DBMS) server and as application server(s) With the development of the 2-tier and 3-tier systems, the HRIS professional still managed the user interface, but more demanding processing occurred in the middle, application server, tier. Products such as BEA's Tuxedo1 transaction processor implemented transaction logic to maintain data reliability. For example, if two recruiters updated the same job position at the same time, a transaction processor would ensure that both updates were entered into the database. This allowed several users to access the central database simultaneously. This type of software, which performed tasks between the client and the database server, became known as middleware— software that managed data and transactions before they were saved to the database. There are a couple of drawbacks with both 2-tier and 3-tier systems. First, a large amount of information has to move from the client computer across the network to the server to execute database transactions quickly, which necessitates the use of significant bandwidth, or the ability to move lots of data quickly between computers. Second, the user Chapter 3 Systems Considerations in the Design of an HRIS. The corollary issue of this requirement is that employees need to be trained on this application. Therefore, HRIS access tended to be limited to employees within the "four walls" of the enterprise, that is, only those residing within the local area network of the organization. Low-bandwidth access, such as Internet dial up, was impractical. To provide for employee self-service, the Web browser was adopted to solve the above issues. The browser

provides a "thin client" and is a relatively small piece of software requiring fairly small client computing resources, made possible by the 3-tier computing model. A "thick client" would require a significant-sized software product and computing power at the client location (as necessitated by the 2-tier model). An Internet Web browser comes installed on all major operating systems (Windows, Mac OS, Linux, and even Palm OS). The browser's user interface has become ubiquitous. Therefore, very little employee training is required to use a browser-based application. Finally, a browser works well in a low-bandwidth network environment. So now the typical HRIS application architecture looks like Figure 3.3. A standard Web server, such as Microsoft's Internet Information Server (IIS) or Apache's Web server, manages communication between the browser and the application server using the Hypertext Markup Language (HTML). The application server manages multiple user sessions logged onto the system at the same time as well as more complex business rule execution. Internet technologies such as the eXtensible Markup Language (XML, which is similar to HTML) and Web services are used to integrate HRIS and ERP. The ultimate goal is to provide a single data truth so that all enterprise data can be accessed by all users wherever and whenever needed. Data should not be duplicated, reentered, or copied to multiple systems. ERP applications provide the infrastructure to avoid this problem. So even though the architecture may be more complicated, this complexity is hidden from the end user, and the logical view of the system remains relatively simple. For example, a consultant for a large IT services company can travel throughout the world, work with multiple clients, but still be able to record his or her time and prepare expense reports using a single browser application from any hotel room.

(iv) The advantages and Disadvantages of using HRIS

Human Resources Information Systems (HRIS) have evolved since the 1980s from relatively simple computer applications to virtual vaults of sophisticated human resources information and processes.HRIS also is the name of the human resources discipline for HRIS specialists and other human resources professionals involved in the technology for employment and personnel matters.An HRIS is used for employment actions such as applicant tracking, performance management, attendance, compensation and benefits management, work force analyses, and scheduling.A very popular use of HRIS is employee self-service. Many employers are utilizing their HRIS to supplement the human resources department staff by enabling employees for find

answers to common questions they would have asked a human resources representative.Any HRIS include reporting capabilities. Some systems track applicants before they become employees and some are interfaced to payroll or other financial systems.An HRIS is a management system designed specifically to provide managers with information to make HR decisions. This is not an HR system...it is a management system and is used specifically to support management decision making .The need for this kind of information has increased in the last few years, especially in large and/or diverse companies, where decision making has been moved to lower levels.And large companies generally have the advantage when it comes to HRIS's...the cost to develop an HRIS for 200 people is usually close to that for 2000 people...so it is a better investment for large companies...larger companies tend to have systems that have a fair degree of customization.Therefore, HRIS can be defined in simple words as given below:

Human Resource Management Systems (HRMS, EHRMS), Human Resource Information Systems (HRIS), HR Technology or also called HR modules, shape an intersection in between human resource management (HRM) and information technology. It merges HRM as a discipline and in particular its basic HR activities and processes with the information technology field, whereas the planning and programming of dataprocessing systems evolved into standardised routines and packages of enterprise resource planning (ERP) software.On the whole, these ERP systems have their origin on software that integrates information from different applications into one universal database. The linkage of its financial and human resource modules through one database is the most important distinction to the individually and proprietary developed predecessors, which makes this software application both rigid and flexible.**HRIS Advantages**Specialist can manage :compliance with federal and state laws,streamline processes for recruitment and selection produce,analyses data and reports for internal and external use,ease of use for qualification computer technology specialists,accuracy of information, ability to perform HR audits using any combination of parameters,Employees and managers can locate answers and information quickly without the need to consult an HR representative every time.,An HRIS can reduce the amount of paperwork and manual record keeping,It retrieves information quickly and accurately,It allows quick analysis of HR issues. **HRIS Disadvantages;** human error during information input,costly technology to update your system, malfunctions or insufficient applications to support your human resources needs,finding

a qualified specialist with human resources functional area knowledge is difficult.,Unauthorized Access,Specialized Knowledge,Data Entry Errors,The cost per-hire for another employee in a specialized field may be a stretch for some small businesses,**New Technology;**With the changing world and constant new technology that is available, managers need to be aware of the technology that will increase effectiveness in their company.Human resource information systems (HRIS) have increasingly transformed since it was first introduced at General Electric in the 1950s.HRIS has gone from a basic process to convert manual information keeping systems into computerized systems, to the HR Information Systems that are used today.Human resource professionals began to see the possibility of new applications for the computer.The idea was to integrate many of the different human resource functions.The result was the third generation of the computerized HRIS, a feature-rich, broad-based, self-contained HRIS.Many companies have seen a need to transform the way Human Resource operations are performed in order to keep up with new technology and increasing numbers of employees.**Terasen Pipelines**moved its headquarters from Vancouver to Calgary to be closer to the oil and realized a major growth in employees.In the past recording keeping was done on paper and with spreadsheets.Mangers at Terasen realized that there was a need to change to a more computerized system and looked into different HRIS vendors.By making the move to a HRIS system, Terasen is able to keep more accurate records as well as better prepare for future growth.

WORKSource Inc.To meet the challenge of handling 100 new employees, WORKSource Inc. acquired Web-based technology programs from GHG Corp. like electronic pay stub, electronic timesheet software, time-off system, and human resource information system ("Tips," 2006).By adapting these new programs, WORKSource was able to reduce waste and cost.PerformanceHRIS systems may track performance reviews and performance issues as part of its management of employee information. Higher-grade systems may also conduct mathematical functions related to this data in order to rate employees based on performance abilities. This information can then be used to make business decisions such as whether to offer an employee a promotion or a boost in pay.Employee Information. All HRIS software maintains a database of information on employees past and present, including such data as pay rates, department, raises and personal information.PayrollMost HRIS software does at least some basic form of payroll processing. Payroll begins with tracking the time spent on certain activities,

usually as reported by the employee him or herself. This reporting is usually done through some sort of software or web application, though some people track work time on hard copy forms that then have to be scanned or transcribed into the computer system. Payroll systems will also conduct necessary accounting and may even print the actual paychecks.Benefits Administration.HRIS systems that conduct payroll operations also usually manage benefits information, such as medical coverage and retirement accounts. These tie in closely with payroll but are also tracked alongside other employee information such as salary and paid time off.Work Time.HRIS systems generally include the capability of tracking employee work-time, especially where employees are paid hourly or are on contract.Types of Software; HRIS systems come in a variety of software configurations. Some systems are hard-coded for local installation on a computer or network at the business' location. Other systems conduct business online as a Software as a Service (SaaS) system, usually over the Internet via web sites or Intranet systems. Finally, some application vendors may provide service as a blend of these types of software.Modular Systems.Different software packages have different capabilities, and some vendors may offer different tiers of service. Basic services are generally provided as part of a package with additional functions being available as modules that can be plugged into the basic package of software

(v) To evaluate the developments in the technology related to HRIS

- **MidlandHR** is a leading supplier of software, consultancy and award-winning outsourcing services for talent management, workforce planning, HR & payroll. MidlandHR's solutions support some of the largest and most successful organisations in the UK, from public, commercial and not-for-profit sectors. This Microsoft Access based open source human resource management system (HRMS) software is designed for small to medium sized business. This powerful and easy to use HRMS software allows your human resource team start working more efficiently on utilizing their time and resource.

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MYOB PayGlobal software is a proven end-to-end workforce management solution with all the integrated payroll and HR management tools you need to improve productivity and add value to yourbusiness.MyPaperLessOffice gives clients the ability to manage HR, payroll, time and attendance, benefits, Workers' Comp, applicant tracking, job posting and paper processes in a

fully integrated, single-entry web-based platform. Time and administrative cost savings are the main by-products of the system, but the most substantial benefit is the ability to track and save all the HR employee documentation created during the life cycle of the employee, from hiring to retirement.Optimum Solutions has provides HR, payroll, and time and attendance software for both IBM System i and Microsoft .NET/SQL platforms. All applications share one master file employee data base to make a completely integrated HRIS system. With a support staff of certified payroll professionals, Optimum can help any U.S. company with their HRIS needs.

The EMPulse Series is a highly configurable Human Resource Management System (HRMS) that allows mid-sized organizations to excel in the following areas: payroll preparation, payroll processing, human resources (HR), job costing and project tracking. Each software component has deep functional capabilities and is tightly integrated onto a common platform that provides seamless visibility across multiple applications.

- **OrangeHRM Professional**: Small- to medium-sized businesses use this comprehensiveHR platform to rapidly build and provide responsive HR services. OrangeHRM Enterprise: Designed to supply seamless governance to multinational companies, Orange HRM Enterprise saves you time and money - wherever in the world your employees are located.When you need to rapidly on-board a full-service HR environment, Orange HRM meets your business and budget requirements.

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Paylite Human Resource Management Software is a comprehensive one-stop solution for small and mid-sized companies. It has been developed specially for GCC members (UAE, Bahrain, Kuwait, Oman, Qatar and Saudi Arabia). It replaces strenuous paper-based, time consuming and error prone HR methods. It can be customized to suit your needs and meet desired level of automation. It uses state-of-the-art technology from Microsoft to streamline your HR workflow. It offers an end-to-end centralized HRMS system which integrates with the Payroll and Self Service Modules seamlessly. Fully integrated HR Online solution from claims submission to attendance checking; and subsequently payroll processing are all set in this suite. Reducing your headaches in a breeze with uploads of Bank GIRO (DBS, UOB, OCBC, SCB, HSBC, etc.) and statutory submission such as Provident Fund (ie.: CPF, EPF), tax (ie.: IRAS, IRBM) and etc. Survey shows lesser hassles yet an increased efficiency which in return enabling

HR users to concentrate on other adhoc tasks such as Employee Engagement and Human Relationship

- **PDS is a leading developer** of a web-based human resource and payroll system offering the highest level of leveraged technologies, and world-class client support services. The Company's mission is to provide the most advanced employee-centric HRMS/Payroll solution in the industry.People delivers an HR administration solution for ambitious HR professionals working in small and mid-sized companies. Unlike manual or older systems that are frustrating to work with, the People solution constructs insightful graphic reports, offers expert 'follow me' guidance, and engages people on missions through high-impact tasks. The solution makes a difficult job more fun and helps aspiring HR professionals eager to earn a more prominent role in their   companies'success.

- **PineappleHR is a cloud** based software managing all aspects of HR and benefits administration from beginning to end, from applicant tracking to off boarding an employee. This All-In-One software offers many modules including Applicant, Personnel Tracking, Automated Hiring/On-boarding, PTO/Leave Management, Time-Sheet Management, Employee Benefit Management,   Employee   Portal,   and   much   more.

- **Piney Creek Digital develops** and markets Web-based applications focusing on the human resource management sector. The company's software automates and digitizes employee benefits   management   and   human   resource   compliance.

- **SharePoint HR Systems for O365** and on-premise deployments - Our SharePoint HR system includes Holiday Management, Absenteeism, Compensation and Appraisal modules and provides self-service for employees and powerful reporting for line managers and HR professionals.

e-HR software that enables organizations to strategically steer the development of it's human capital. Functionalities include job descriptions, competency, accountabilities & training

management, performance appraisal, 360° feedback and e-recruitment.

- **Projector is a cloud-based Professional Services Automation (PSA**) suite that helps project-based service organizations improve their operations. Its features are designed to support organizations ranging from small start-ups to complex global organizations. Projector helps organizations manage time and expense tracking, client billing, and project and resource management within an intuitive and efficient user interface. Powerful analytical reports and executive dashboards provide unparalleled visibility into operational and financial performance. Pre-built interfaces allow for easy integration with popular accounting, CRM, and project management applications, and an open architecture permits integration with legacy systems. Projector is charged for on a per user per month basis with no startup costs, cancellation fees, or minimum time commitment. Sign up on our web site for a free 30-day trial or contact us for a live   demo.

- **Prospera® is a** people management tool that provides a better approach to engaging and developing the people in your organization. Recruit and retain quality employees, increase employee engagement & job satisfaction, and guide employees and yourself in career development.

- **Quadrant HR™** is a user-defined, configurable software and services solution integrating best practices for Human Resources, Staff Scheduling and Payroll into a single system. Quadrant **HR™ is** designed to improve employee processes from hire to retire for simple to complex multi-site, multi-position, multi-contract workplaces.

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Sentrifugo is the next generation power packed Human resource management tool for small and medium sized enterprises. An innovative, self-service HRMS that allows you to track your diverse workforce effectively. The HeartBeat solution supports employee and manager self-service, benefits enrollments, and time-off balances and accruals.

- **SumTotal HR Management is an enterprise-class human resources management** system (HRMS) that centralizes, consolidates, and integrates core HR information into a definitive employee system-of-record.The application delivery model is enhanced by open

standards architecture delivering enterprise-class HR functionality at affordable prices. This highly innovative approach offers business-critical advantages over traditional HR platforms. SysforeHRMS is an independent, stand-alone software application that helps the Human Resource department of an organization to automate and streamline its daily processes. It enables the creation of comprehensive employee records to aggregate, manage and report on all employee related information during the complete lifespan of service of the employee with the organization.

- **Talentia Software is** a leading European software group that develops and implements business management software for Finance, CPM, Payroll and Human Capital Management. With over 430 employees, we provide solutions for SMEs, mid-range and large organisations and our solutions are currently used by more than 3,500 customers in over 30 countries. Talentia Software provides a leading-edge human capital management solution called Talentia HCM (formerly Cezanne Software). The system helps companies better develop, manage, reward and retain their most important asset - their people. The software provides a flexible, people-centred solution that improves the day-to-day execution of HCM strategies, drives the HR processes critical for the organisation's success and helps companies to develop and maintain a competitive talent advantage.

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