

Impact of Human Resource Information Systems on Firms' Financial Performance

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Abstract

This study analyzed the impact of the applications of human resource information system (HRIS) on firms' financial performance. Performance estimation models developed based on five years performance related data extracted from annual reports of total 41 (89%) banks operated under four strata: state-owned commercial (9%), specialized (6%), private commercial (63%), and foreign commercial banks (11%) in Bangladesh while multivariate analysis of covariance (MANCOVA) tested to examine the varied corporate financial performance according to ownership patterns. The study found direct and positive relations of HRIS applications with the firm's financial results. However, the corporate performance does not vary significantly according to the ownership patterns. Moreover, the findings of the study may lead human resource (HR) professionals and other stakeholders to enhance their financial intelligence about its applications in business which may eventually enable them to be strategic partners in the acute global market environment.

Keywords: financial intelligence, human resource information system (HRIS), human resource (HR) professional, impact, strategic partner

1. Introduction

Human resources have undoubtedly been playing a major role for organizations succeed from the beginning of the term human resources (HR) emerged since late 1960 and early 1970. Indeed, HR performing manipulates organization success in today's knowledge economy (Lippert & Michael Swiercz, 2005; Troshani, Jerram, & Hill, 2011). On the other hand, organizations than any time before emphasize on strategic objectives and shareholder values that led to changes in both job content and expectations of HR professionals (K. Ball, 2000; Cornelius, 2000; Mabey, Salaman, & Storey, 2000; Storey, 1992). One of the major changes has been the modern use of IS in support of HR process (Hagood & Friedman, 2002; Mayfield, Mayfield, & Lunce, 2003; Schuler, Jackson, & Storey, 2001; Ulrich, Geller, & DeSouza, 1984). Thus, organizations now-a-days are becoming strongly dependent on human resource information system (HRIS) to upsurge the effectiveness of human resource management (HRM) (Lippert & Michael Swiercz, 2005; Obeidat, 2012; Troshani et al., 2011). Over the last few decades, organizations have been using HRIS more to manage their human talented (K. S. Ball, 2001; Barron, Chhabra, Hanscome, & Henson, 2004; Hussain, Wallace, & Cornelius, 2007; Ngai & Wat, 2006). HRIS is defined as a computerized system that is used to receive, store, manipulate, recover and deliver relevant HR information (Kavanagh, Thite, & Johnson, 2012; K. A. Kovach, Hughes, Fagan, & Maggitti, 2002). HRIS, as new technology in HRM, also contributes to the firm performance like traditional HR practices. An integrated HRIS may have a wide range of uses from simple spreadsheets to more complex calculations performed easily (Perry, 2010). Most of the studies revealed that this technology automates administrative HR processes (Bondarouk, Ruël, & van der Heijden, 2009; Lee, 2007; Strohmeier, 2009; Tansley, Newell, & Williams, 2001), increase HR efficiency, and assist in a wide variety of HR management decisions (Beckers & Bsat, 2008; Bondarouk et al., 2009; Hussain et al., 2007; Lukaszewski, Stone, & Stone-Romero, 2008; Ngai, Law, Chan, & Wat, 2008). Ngai and Wat (2006) extended that HRIS also leads employees to quick response and access to the relevant information. Besides, HRIS facilitates the HR department to ensure greater information accuracy, faster information processing, improved HR planning and program development, improved employee communications

and lower HR costs (Awazu & Desouza, 2003; K. S. Ball, 2001; Slavic & Berber, 2013; Troshani et al., 2011; Wiblen, Dery, & Grant, 2010). However, the applications of an HRIS do not only have an influence on HR department but also a deep influence on the employees job satisfaction and turnover intention (Maier, Laumer, Eckhardt, & Weitzel, 2013; Marler & Fisher, 2013). Though, the administrative benefits (Beadles, Lowery, & Johns, 2005) of HRIS have relatively justified, but no study found on the firm's financial aspects of HRIS implementation. Marler and Sandra (2013) reviewed 40 studies related to these aspects from 1999 to 2011 and no empirical evidence found on HRIS applications and financial performance. Authors argued that financial accounting outcomes are a major determinant of firm performance (Dyer & Reeves, 1995) while firm performance is one of the strategic outcomes of HRM (Becker & Huselid, 1998). However, there remains lack of research on the impact of HRIS applications on the firm's financial outcomes. In addition, as today's HR professionals wish to be strategic partner by contributing significant amount to the firm's financial outcomes. They need to have financial intelligence (knowledge on firm's financial performance outcomes and how financial decisions taken) on HRIS applications (Tamer & Muzaffer, 2013). In this junction, it needs to explore the financial impact of HRIS applications in business. To fill up this gap, here we tried to examine the relationship between applications of HRIS and firm's financial performance, specifically by addressing two questions: a) is there any relationship between the applications of HRIS and firm financial performance in terms of income, profit, return on investments (ROI), return on assets (ROA) and return on equity (ROE)? and b) do these relationships vary according to the firm's ownership patterns? To generalize the study objectives, we developed hypothesis for each of them. To examine the first objective, five regression models were built based on firm's five years performance related data while multivariate analysis of co-variance (MANCOVA) tested to justify the second objective. Findings of the study may benefit in two ways: it may upsurge HR professionals' financial intelligence regarding HRIS implementations and it may also complement and extend the existing literature on the impact of HRIS applications in business.

The reminding sections in this paper are stated here. Theoretical discussion on IT, HR, HRIS and firm performance has presented in section 2. This section further highlights the HRIS service providing sub-systems. Scales on HRIS index and financial performance outcomes construct next, where section 4 is on the hypotheses development. The next section describes the nature of collected data with sampling procedure. Section 6 highlights the major findings on the study while discussion on them showed next. After that, section 8 points out limits of this study while strategic implications stated in section 9. Conclusion is in the final section.

2. Theoretical Background

2.1 IT, HR and Firm Performance

Information technology (IT) has been used as a key driver of many technological innovation and organizational evolution (Liang, You, & Liu, 2010) since its emergence in the 18th century (Harris & Nelson, 2008). Its effects spread over almost every sphere in practice from personal life to social life as well as individual to organizational level (Zafiroopoulos c., Vrana v., & Paschaloudis d., 2006). Especially, it has now-a-days become a fundamental part of the most business operations. Authors argued almost all modern organizations are subject to some technologies (Marler & Fisher, 2013). Several studies have already conducted by some prominent researchers about the impact of IT on business performance. Many theories on information system have proposed to elucidate the widespread use of IT in business. Some of them are resource-based view (RBV), transaction cost theory (Li & Ye, 1999; Subramani, 2004), coordination theory (Lai, Wong, & Cheng, 2008; Straub, Rai, & Klein, 2004), media richness theory (Lai et al., 2008; Straub et al., 2004), and social exchange theory (Goo, Kishore, Nam, & Song, 2007; Han, Lee, & Seo, 2008). Each of these theories has identical research domain. Among these theories, RBV, as a major theory in strategic management, had adopted to explain the relationship between IT services and firm performance by Wernerfelt (1984). According to this theory, firm performance is a determinant of the resources it owns. The more the firm resources are valuable, rare, and inimitable and non-substitute, the more the firm's competitive advantage is sustained. Here, IT as a compliment of firm's other resources increase the value of its resources and capability (Bharadwaj, Bharadwaj, & Bendoly, 2007) that eventually boosts up the firm performance (Liang et al., 2010). Authors argued that IT with firm's other complimentary resources affect the business effectiveness that improved firm performance. On the other hand, Wright and McMahan (1992), based on Barney's (1991) resource-based theory of firm, concluded that firm can enjoy sustained competitive advantage if its existing HR are met the four attributes, such as; valuable, rare, inimitability and non-substitute. For example, they must be able to add value to the firm's production process, secure the skills that are rare and non-imitable, and finally not subject to the replacement by any technology and other substitutes. Hence, it is clear from the above discussion that IT and HR are the firm's two

resources that improve the value of the firm other resources and capability that consequently improve its performance.

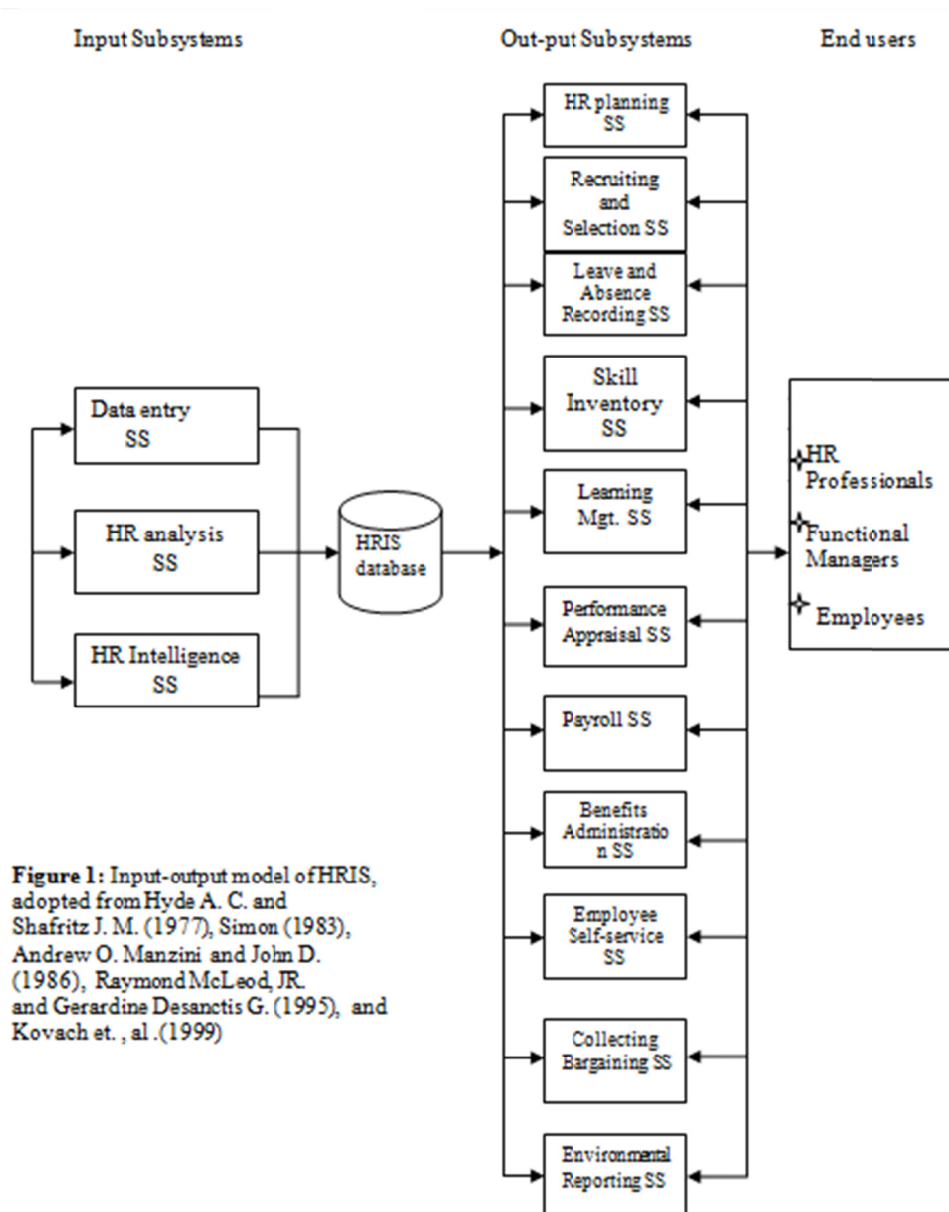
2.2 HRIS and Firm Performance

IT application in HRM has been continuously increasing rapidly from the beginning of 1990. From that period, its use and impact on HRM has been attracting the researcher (Eddy, Stone, & Stone-Romero, 1999; Kovach & Cathcart, 1999; Shrivastava & Shaw, 2003). Advances in IT have changed the HR functions within organizations. Now-a-days, many organizations have come under the services of an HRIS to support HR department in performing basic HR functions, enhancing administrative efficiency, improving decision making, as well as speeding up information sharing (Lengnick-Hall & Moritz, 2003). While, Chugh (2014) mentioned that reducing workload by minimizing repetitive administrative tasks, is one of the main benefits of HRIS. Usman Sadiq, Ahmad Fareed Khan, & Khurram Ikhtlaq (2012) conducted a study between the impact of information systems and HR department performance, based on opinions from 18 HR managers employed at the various corporations running in Lahore, Pakistan. Findings of the study suggested implementing HRIS as a tool to achieve greater administrative efficiency by adding values in the department. In extent, HRIS allows HR managers to take part in strategic decisions making by being informed with real time relevant information about firm's human talented (Lengnick-Hall & Moritz, 2003). Another study conducted by Sharyn D. Gardner and Bartolc (2003) on virtual HR: the impact of information technology on the human resource professional. Their study suggested HR professionals to use IT in HRM functions that enable them to more efficiently access and disseminate relevant information. Apart from the useful application of IT in the functions of HRM, training and development aspect is mostly supported by IT at cost-effective way. After all, HRIS application in business, boosts up the efficiency of HR process (Beadles et al., 2005; Black & Porter, 1996; Maier et al., 2013; Slavic & Berber, 2013) helps in HR management decisions, improves job satisfaction (Maier et al., 2013), reduces turnover, and upsurges training effectiveness and career management along with automates the administrative HR process (Maier et al., 2013; Slavic & Berber, 2013,).

But purpose of this technology is not limit to HR administrative (operational) efficiency only but also extended to the strategic HRM outcomes (Maier et al., 2013). Strategic HRM outcomes consist of organizational performance (Becker & Huselid, 1998), strategic alignment, competitive advantage (P.M. Wright, Dunford, & Snell, 2001) and HR outcomes. However, the motivation of adopting more complex HR practices focused on the organization's overall performance. Though, financial accounting outcomes as one of the most useful measure of firm performance (Dyer & Reeves, 1995), but research on the applications of HRIS and firm performance remains uncovered. Marler and Fisher (2013) reviewed 40 studies related to the applications of HRIS and firm performance from 1999 to 2011 and no empirical evidence found on the stated relationships. However, there remains lack of research in HRIS applications and its impact on firm's overall financial performance.

2.3 HRIS Service Providing Subsystems

Literally, thousands of HR computer applications are available from software houses, consulting firms, as well as company's own system developers (K. Kovach & Cathcart, 1999). However, HR managers use many HR related sub-systems to provide IT supportive HR services. An integrated-HRIS consists of two types of subsystems: Input and output (Figure 1). Here, we extracted some sub-systems from the different HRIS models constructed by Hyde and Shafritz (1977), Simon (1983), Andrew Manzini and John (1986), and Raymond McLeod, JR. and Gerardine Desanctis (1995), Kovach et al. (1999).



2.3.1 Input Sub-Systems (SS)

Employees enter HR related data into the HRIS database through one of three input subsystems: data entry and processing, HR analysis and HR intelligence. Each of these subsystems consists of all types of data entry processes, such as; those involved keyboard, mouse input and optical scanning. Data entry and processing SS consists of those systems residing both in the accounting and HR department which enters and processes data about human resources (such as; name, address, personal details, etc.). Specially, this sub-system is essential for diversified companies with large-scale operations. On the other hand, HR analysis SS facilitates to analyze and provide data on the firm's human resources, such as; trace out best performer, forecast potential vacancies due to any demand and termination, and describe job content with the knowledge and skills required. Finally, HR intelligence SS facilitates to extract and maintain environmental information related to human resource activities. Usually, information highlights the describing activities of labor unions, government, local and financial communities, competitors as well while commercial database is one of the best sources of the intelligence data.

2.3.2. HRIS Database

Data and information gathered through input subsystems are then stored in the computer storage to serve different HR applications efficiently by centralizing and minimizing redundant data. The data consist of

employees with environmental elements with which HR interfaces. Where, database management system (DBMS) works out the data maintenance processes. This software permits organization to centralize and manage data efficiently as well as provide access to that data.

2.3.3 Output Sub-System (SS)

HRIS, with the help of different output sub-systems, provides pertinent information about HR to the HR end users. These subsystems work for transforming data from database into useful information as outputs that help HR end users to take strategic decisions related to firm's HR. HR planning SS provides data on the firm's human resources by assessing and forecasting existing human resources and future requirements. It helps HR managers to ensure the right number and capable people at the right places on right time. It enables HR managers to monitor the workforce, produce reports, and utilize employee skills effectively. On the other hand, e-Recruitment now-a-days seems most commonly used HR applications in business (Bussler & Davis, 2001; Dineen, Noe, & Wang, 2004; Kumar, 2003; Kuzmits & Santos, 2003; Lin & Stasinskaya, 2002). It facilitates to keep the details of recruitment and selection activities, such as; cost and method of recruitment and selection, time to fill the position, and provide necessary information to the users on timely fashion. Frankland (2000) pointed out the Cisco Corporation reduced total 45 percent in recruitment costs by using the web as its core channel for recruitment. While, leave and absence management SS maintains and provides information on employees' leave and absence issues. It also enables to provide comprehensive method for controlling leave and absences. Skill inventory SS is used to store, disseminate information about employees acquired skills and monitor that skills' database at both employee and organizational level. On the other hand, learning management SS facilitates HR department to keep record on employee training as well as development activities. It also assists HR managers approving training budget and calendar. As one of the objectives of using HRIS in business is to measure employee performance (Berry, 1994) performance appraisal sub system can be used to reduce the effort and agony of managing performance evaluation. Performance evaluations from supervisors, peers, customers or subordinates can easily be followed up in online (Eric W. T. Ngai, Chuck C. H. Law, Simon C. H. Chan, & Francis K. T. Wat, 2008). Payroll sub-system is another most frequently used HRIS output sub-system. This subsystem provides employees real time information on the breakdown of salaries, deductions and accumulated benefits (Eric W. T. Ngai et al., 2008). Moreover, it can encompass all employee related transactions as well as integrate with existing financial management system. Further, benefits administration SS facilitates organizations to administer and track employee participation in benefits programs, restructuring benefits functions and redefinitions of the benefits program (Stanley, 1995). These typically encompass insurance, profit sharing, retirement benefits, stock purchase option and flexible benefits etc. Whereas, employee self-service SS can fulfill the employees need by applying web based employee self-servicing applications (O'Connell, 1996). It allows employees to manage their performance goals & results and plan their performance on their personal page as well as managers to upload immediately performance assessment results (Adamson & Zampetti, 2001). Apart from the above mentioned out-put sub-system, collective bargaining SS can be helpful in facilitating negotiations by providing up-to-date data related to facts and figures. A computer terminal positioned in the conference room is linked to database. This will expedite the negotiations process. Finally, environmental reporting SS provides information about whether organization involves fair HR practices by addressing environmental issues, such; EEO records, EEO analysis, health records, toxic substance, grievances and union increases.

3. Scale Development

3.1 HRIS Index

Despite having several uses of HRIS, Mathis and Jackson (2013) stated 33 HR activities that can work out under the benefits of HRIS. In this study, we developed HRIS index based on those HR activities with minor revisions. These 33 HR activities further categorized into seven broad areas of HRM, such as; HR planning and analysis, equal employment, staffing, HR development, compensation and benefits, health, safety and security, and employee and labor relations. The detailed list of this scale is shown in Table 1. Since, absolute data in this area confined of improper record and unavailability, the study developed HRIS applications index based on the relative information from the firms' HR managers on the stated 33 aspects. Hence, HRIS applications index for each bank calculated based on the responses of HR manager from that bank. Scores allocated as 1 (one) for each use and 0 (zero) for not use at all. So, total HRIS index scores assigned into 33.

Table 1. Applications of HRIS

Category	Usage of HRIS
HR planning and analysis	Organization charts
	Staffing projections
	Skills inventories
	Turnover analysis
	Absenteeism analysis
	Restructuring costing
	Internal job matching
Equal employment	Affirmative action plan
	Workforce utilization
Staffing	Availability analysis
	Recruiting sources
	Applicant tracking
HR development	Job offer refusal analysis
	Employee training profiles
	Training needs assessments
	Succession planning
Compensation and benefits	Career interests and experience
	Pay structures
	Wages/salary costing
	Flexible benefit administration
	Vacation usage
	Benefits usage analysis
	401 (k) statements
	COBRA notification
	Safety training
	Health, safety and security
OSHA 300 report	
Material data records	
Union negotiation costing	
Employee and labor relation	Auditing records
	Attitude survey results
	Exit interview analysis
	Employee work history

Source: Adopted from Mathis, R. L., & Jackson, J. H. (2013). *Strategic human resource management: Human resource management*. (Tenth ed.). Singapore: Melissa Acuna.

Since, applications of HRIS vary among the organizations, the study tested T-test to justify the significant variation among the companies. The test found significance variance ($t=0.000$) of HRIS applications among the companies (see Table 2).

Table 2. Results of one-sample T-test

	N	Mean	Std. Dev.	T	Sig. (2-tailed)
HRIS applications index	41	16.46	4.261	24.741	0.000

3.2 Financial Performance Indicators

Higher financial performance or maximization of wealth for stockholders is the ultimate goal of business organization (B. E. Becker & Huselid, 1998). Many researchers tried to explain the relationship between HR practices and corporation financial performance in their literature (Black & Porter, 1996; Ichniowski & Shaw, 1999; Neumark, 2001). However, the study also measured firms' financial performance based on historical (accounting data) data extracted from their annual reports and analyzing them by calculating some relevant

financial ratios which draw attention to as a firm's most important items. It would be convenient and accurate analysis of firms' financial performance if there would have all the required financial information in accurate form. But firms' financial statements presented in their annual reports are often limited. However, we considered five comparatively common financial performance ratios as signs of measuring firms' financial performance. These are revenue each employee (Nkomo, 1987; Tamer & Muzaffer, 2013), profit an employee (Tamer & Muzaffer, 2013), return on assets (ROA) (Nkomo, 1987) and return on equity (ROE) (Chew & Sharma, 2005) and return on investment (ROI) (Tamer & Muzaffer, 2013). Since the scale consists of 5 subscales (scale with fewer than 10 items) it is more suitable to report the mean inter item correlation for the items to test the reliability of that scale. As ideal range for inter item correlation is 0.2-0.4 (Briggs & Cheek, 1986). Therefore, financial performance scale consisting five subscales (income each employee, profit an employee, ROI, ROE and ROA) is reliable (mean=0.409) for the further study (see the table-3).

Table 3. Reliability test scores on financial performance scale

	Mean	Min.	Max.	Range	Max./Min.	Variance	N of items
Inter-Item Correlations	0.409	0.160	0.739	0.579	4.622	0.034	5

3.3 Control Variables

The estimation of regression models developed to provide the unbiased estimates of the impact of HRIS applications on the firm financial results. Thus, the control variables for each dependent variable was selected based on previous empirical works targeting those variables likely to be related with the both HRIS applications and dependent variables. The controls for each dependent variable included ownership pattern, total employee (firm size), volume of capital, income and profit.

4. Hypothesis Development and Conceptual Framework

4.1 HRIS Applications and Firms' Financial Results

HR practices have significant impact on organizational performance relatively justified in many studies from the developed to developing countries (Delaney & Huselid, 1996; Katou & Budwar, 2007; Singh, 2004; Tzafir, 2006). Becker and Gerhart (1996) explained that HR decisions influence organizational performance through either improving HR efficiency or contributing to revenue growth. Moreover, HR practices have direct and positive relation on the business financial aspects (Akdere, 2009; Björkman & Budhwar, 2007; Chew & Sharma, 2005; Huselid, 1995). For example, it has impact on income by employee (Nkomo, 1987; Tamer & Muzaffer, 2013), profit (gross & net) (Akdere, 2009; Chew & Sharma, 2005), profit by employee (Tamer & Muzaffer, 2013), sales growth (Nkomo, 1987; Panayotopoulou & Papalexandris, 2004; Tamer & Muzaffer, 2013), return on asset (ROA) and assets each employee (Nkomo, 1987), asset turnover, equity turnover, receivable turnover, and return on equity (ROE) (Chew & Sharma, 2005). The Society for HRM and CCH Incorporation contracted for a study (under Dr. Cheri Ostroff direction, Associate Professor at the University of Minnesota's Industrial Relations Center) to evaluate the financial impact of HR practices (CCH Incorporated, 1995). An overall quality of HR index developed for each firm and the study results clearly pointed out organizations with high quality of HR practices have higher business results. On the other hand, the rapid development of the ICT during the last two decades has increased the HRIS implementation (Strohmeier, 2009). IT has considerable potentiality that managers can use in human resource functions in particular to escalate the organization's capabilities (Tansley & Watson, 2000). A meta-analysis conducted by Liang, You, and Liu (2010) on 42 published empirical studies that adapted resource-based view (RBV) to examine whether information technology (IT) and organizational resources have significant effect on firm performance. They also found organizational capabilities as mediators between organizational resources and firm performance. They suggested that organization should use IT to resources that can increase the firm capabilities which ultimately increase the firm performance. Hence, our first hypothesis is:

H1: *Applications of HRIS have direct and positive relations with the firms' financial results: income per employee, profit per employee, ROA, ROE and ROI.*

4.2 Ownership Patterns and Firms' Financial Results

HRM practices differ across the profit or not-for-profit sectors (Rondeau & Wagar, 2001) as well as public and private sector organizations (Boyne, Jenkins, & Poole, 1999). In an Australian study on the influence of various strategic HRM practices and perceived overall performance in the health sector, private-sector health service

organizations had a higher perceived performance than public-sector health organizations (Rodwell JJ & STT Teo., 2008). Similarly, an evolution on human resource development (HRD) in Australian organizations was conducted based on 13 years period from 1996-2009 and analyzed the effect of ownership pattern, the company size, and industry sector on HRD practices. Among the results, the study revealed limited differences in HRD practices between public and private sector organizations (Peretz & McGraw, 2011). Moreover, from the results of one sample T-test presented in the subsection 4.1 of this study, it is clear the applications of HRIS significantly vary among the organizations. Consequently, we looked for whether the variations of HRIS applications according to the ownership patterns have significant impact on the firms' financial performance outcomes. Therefore, our second hypothesis is:

H2: The variations of HRIS applications according to ownership patterns have significant impact on corporate financial outcomes.

5. Method

Samples were taken from the banking industry of Bangladesh given significant contribution to the country's GDP since 1972 consistently. This whole industry consists of 55 scheduled banks (listed in the Central bank of Bangladesh) having 8427 branches (Annual report: Some selected statistics-2013) classified into four categories. These are state-owned commercial banks (04) specialized banks (04), private commercial banks (38) and foreign commercial banks (09). A total 46 out of 55 banks considered for the study as rest of the banks has only one or two years of experience to keep the result free from insignificant impact on the study results. Data on firms' financial results extracted from the financial statements highlighted in the annual reports of 2009-2013. Out of 46 banks, the completed financial data found from 41(89%) under four strata: state-owned commercial (9%), specialized (6%), private commercial (63%), and foreign commercial banks (11%). One HR manager from each bank surveyed through mail questionnaire to get idea about the practices of HRIS in their company.

To test the hypothesis-1, the firms' five financial indicators: revenue per employee, profit per employee, ROA, ROE and ROI regressed with the obtained HRIS application scores. Multivariate analysis of co-variance (MANCOVA) tested to justify the hypothesis-2, while the variation of HRIS applications among the companies considered as covariate. Finally, the obtained results discussed with the previous findings.

6. Results

The table 4 highlights means, standard deviations and correlations. Average number of total employment is 4018, while average annual capital is Tk. 11880.77 million. Total average annual income is Tk. 10762.56 million and average annual income per employee Tk. 4.51 million. In addition, average annual total profit is Tk. 4195.58 million and average annual profit per employee Tk. 1.51 million. On the other hand, annual return on investment (ROI) 10.96 percent indicates that return of Tk. 10.96 against each Tk. 100 investment in capital stock. Average annual return on equity (ROE) 20.93 percent indicates return of Tk. 20.93 for each Tk. 100 of shareholders' equity. Finally the average annual return on assets (ROA) 1.46 percent indicates return of tk. 1.46 for each unit of Tk. Assets value of Tk. 100.

6.1 Corporate Financial Outcomes

Table 5 presents the results of regression analysis through five models for hypothesis 1. The first model is on the income an employee having the control variables with expected signs and significant levels. The model estimates practical significance of the impact of HRIS applications. The practical impact, considering all other control variables at their means is 0.506 million (or Tk. 506000). Findings of this model indicate that one standard deviation increase of HRIS applications raises income on an average of Tk. 506000 per year. This substantial figure represents around 11.22 percent of the average annual income per employee (Tk. 4510000). Model 2 shows the regression results of the profit an employee. The practical impact of one standard deviation increase in HRIS applications raises average profit an employee Tk. 0.706 million (Tk. 706000) per year. This substantial figure represents around 46.75 percent of the average annual profit an employee (Tk. 1510000). Model 3 highlights the regression results of the return on investment (ROI). Findings indicate the true impact of one standard deviation increase in HRIS applications that raises return on investment (ROI) 0.735 percent. This substantial figure represents around 6.71 percent of the average annual return on investment (10.96 percent).

Model 4 highlights the regression results of the return on assets (ROA). Though beta score is significant at $P \leq 0.1$, but the model is not significant (adjusted $R^2 = 0.04$). On the other hand, the study did not find any significant relationship between the applications of HRIS and return on equity ($p \leq 0.1$).

6.2 Ownership Patterns, HRIS Applications and Corporate Financial Outcomes

Table 6 summarizes the significant results from the analysis of multivariate analysis of covariance (MANCOVA).

Since, there were an independent categorical variable (ownership patterns), a numerical covariate (HRIS applications index) and more than two dependent variables (financial performance indices), MANCOVA is suitable tool to analysis the significance relationships among them. Here, the study excluded ROE and ROA from the further analysis based on the results found from regression analysis (insignificance with the applications of HRIS). As, MANCOVA requires the samples in each category more than the number of dependent variables, hence the study further excluded the specialized banks from the further analysis. Preliminary checks conducted to ensure there is no violation of the assumptions of this statistical tool, such as; normality, linearity, homogeneity of variances, homogeneity of regression slopes and reliable measurement of the covariate. After adjusting the covariate (HRIS applications), the study found no statistical significant variances on financial performance indicators (income each employee, profit an employee, and ROI,) among the three categories (state-owned, private commercial and foreign private commercial banks). The test results for income by employee, $F(1, 20) = 1.09$, $p = 0.375$ with a small effect size (P.E.S. = 0.141), profit an employee, $F(1, 20) = 1.626$, $p = 0.215$ with a small effect size (P.E.S. = 0.196), and ROI, $F(1, 20) = 1.738$, $p = 0.191$ with a small effect size (P.E.S. = 0.207) (see Table-6).

Table 4. Means, standard deviations and correlations

	Mean	Std. Dev.	1	2	3	4	5	6	7	8	9	10	11
1 Ownership pattern	2.85	0.760	1										
2 Employees	4018	4706.81	-0.744*	1									
3 Capital	11880.77	8855.93	0.079	0.537*	1								
4 HRIS index scores	16	4.20	0.608*	0.518*	0.358*	1							
5 Total income	10762.56	9176.85	-0.241	0.674*	0.334*	-0.07	1						
6 Income P/E	4.51	3.33	0.406*	-0.386**	0.190	0.629**	0.184	1					
7 Total Profit	4195.58	3625.13	-0.015	0.585*	0.431	0.191	0.842*	0.023	1				
8 Profit P/E	1.51	0.96	0.515*	-0.413**	0.378**	0.849*	0.096	0.807*	0.173	1			
9 ROI	10.96	5.58	-0.358**	0.229	0.327	0.613*	0.089	0.358	0.358**	0.632*	1		
10 ROE	20.93	11.96	0.535*	-0.225	0.291	0.438*	1.09	0.067	0.44*	0.155	0.536*	1	
11 ROA	1.46	2.18	0.149	-0.112	0.232	0.448*	-0.19	0.131	0.043	0.178	0.483*	0.6*	1

Note. **Correlation is significant at 0.05 levels (2-tailed);

* Correlation is significant at 0.01 levels (2-tailed).

Table 5. Results of regression analysis for corporate financial performance indicators

	Model-1 (Income P/E)		Model-2 (Profit P/E)		Model-3 (ROI)		Model-4 (ROE)		Model-5 (ROA)	
	Beta	S.E.	Beta	S.E.	Beta	S.E.	Beta	S.E.	Beta	S.E.
Ownership pattern	0.023	0.662	0.29	0.157	0.006	1.584	0.538	4.279	-0.371	1.081
Number of employees	-0.544*	0.000	-0.295**	0.000	0.138	0.000	0.089	0.001	0.071	0.000
Volume of capital	0.165	0.000	0.295**	0.000	0.115	0.000	0.163	0.000	0.034	0.000
Operating Income	1.55*	0.000	0.295***	0.000	-0.086	0.000	-0.076	0.000	0.034	0.000
Operating profit	-1.147	0.000	0.094	0.000	0.114	0.000	-0.068	0.001	-0.281	0.000
HRIS applications	0.506*	0.113	0.706*	0.270	0.735**	0.283	-0.024	0.635	0.654***	0.185
R ²	0.822	.	0.879	.	0.357	.	-0.021	.	0.04	.
R ² change	0.857	.	0.903	.	0.511	.	0.0206	.	0.233	.
F for R ² change	24.03	.	37.3426	.	3.311	.	0.906	.	1.216	.
N	31	.	31	.	26	.	28	.	31	.

Note. *p is significant at less than 0.01 (2-tailed test).

**p is significant at less than 0.05 (2-tailed test).

***p is significant at less than 0.10 (2-tailed test).

Table 6. Summary results from the test of MANCOVA

Source	Dependent variables	Levene's test of Equality		Test of between subjects effects		
		F	Sig.	F	Sig.	P. E. S.*
Ownership patterns	Income P/E	1.554	0.230	1.094	0.375	0.141
	Profit P/E	0.650	0.592	1.626	0.215	0.196
	ROI	1.251	0.317	1.738	0.191	0.207

*Partial Eta Squared.

7. Discussion

The existing study tried to explore the relationship between the applications of HRIS and the firm's financial results. To make sense, two most commonly used statistical tools: Regression and MANCOVA were tested. Five corporate financial performance indicators (income P/E, profit P/E, ROI, ROE and ROA) regressed with the applications of HRIS while firm ownership patterns, volume of capital and total number of employees kept as control variables. The study results explained as one standard deviation change in HRIS applications on the firm's financial performance rather than one unit change of HRIS applications. Considering other things remain constant, one standard deviation increase in HRIS applications raises average 11.22 percent income an employee, 46.75 percent profit each employee, and 6.71 percent return on firm's investment by year. On the other hand, there are no significant relationships between the applications of HRIS and firm's ROE and ROA. These findings complement with Usman Sadiq et al., (2012) study on the impact of information systems on the performance of HR department. Similar results on HRM practices and firm's financial outcomes also found from some previous studies (Akdere, 2009; Chew & Sharma, 2005; Nkomo, 1987). However, HRIS does not only upsurge the administrative or operational HR efficiency but also improve HR strategic outcomes as higher financial outputs in the form of higher income and profit per employee, and return on investment. Further, the study tried to explore whether the firm's financial performance (income P/E, profit P/E and ROI) vary according to the ownership patterns while applications of HRIS acted as covariate. Our study found no significant variance on income per employee, profit per employee and return on investment among state-owned, private and foreign private commercial banks. But, the finding does not conform to the Australian study conducted by Rodwell and Teo (2008) on health sector mentioned in section 5.2 of this study. This may be the cause of having high and almost equal capital volume among the banks determined by the central bank of Bangladesh. As a result, all of them are almost equally capable to invest in new technology like HRIS.

After all, clearly applications of HRIS have significant positive impact on firm's financial performance irrespective of ownership patterns; state-owned, private and foreign private commercial banks. However, findings from the study may increase financial intelligence of today's HR professionals by knowing the financial

benefits over relatively justified operational benefits of HRIS applications in business. In addition, this study may broaden the existing literature on the true impact of HRIS applications in business by revealing its almost hidden financial benefits. Finally, the study findings may also provide a good starting point to the future researchers for further study on the financial aspects of today's HRIS applications.

8. Limitations

Like other research studies, the existing study is also under limits. This study limited to at least four specific issues. First, the existing study developed HRIS application index based on only the responses of one respondent from each bank. So, the study was limit to only one respondent's responses. Second, although, the firm's financial performance outcomes consist of many indices, but our study is limit only to five indices: income each employee, profit an employee, return on investment (ROI), return on equity (ROE) and return on assets (ROA). Third, the study considered accounting income and profit for 5 years but excluded inflationary impact. Finally, we measured the financial results based on the data highlighted in firms' annual reports. However, annual reports may not guarantee the data accuracy because it may sometimes incorporate intentionally inflated figures by some managed accredited auditors that may not match with the reality.

9. Implications

Since, today's HR professionals want to be strategic partners of the business success by contributing significant amount to the firm's financial outcomes. The results of existing study may place the HR professionals to improve their financial intelligence about the HRIS applications in the business. As banking industry is under intense competition, the study results may enable the firms to keep their efficiency highlighting on the true significance of this technology. It may create awareness among the employees and employers about the significance of HRIS applications in business. Regulatory bodies may take support from the existing studies to draw up suitable HR policies and strategies. Finally, it may be good starting point for the future researchers for further study about the financial impact of HRIS applications in business.

10. Conclusions

This study showed the impact of HRIS applications to organizational financial performance. Further, it explored whether the financial outcomes vary according to the applications of HRIS based on the firm ownership patterns. The study used regression analysis tool while keeping some factors as control variables. The result indicates the applications of HRIS have direct and positive impact on the firm's financial results. It further used MANCOVA and found the ownership patterns do not have any significant impact on the firm's financial results. Although quantitative measurement of firm's HRIS applications is difficult but not impossible. If HR managers be careful about selecting of suitable measurement and statistical tools, it will be easier to measure the financial aspects of HRIS applications. Financial impact of HRIS applications with its relatively justified intangible/ nonfinancial benefits will improve HR professionals' perceived standing within the firm. This financial with nonfinancial HR managers' intelligence may lead them to be strategic partners by contributing significant amount to the business success. Thus, the study suggests the HR professionals, managers and employees to highlight on the successful applications of HRIS in their business to be strategic partner of the business success.

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