

THE INTENSITY OF HUMAN RESOURCES INFORMATION SYSTEMS USAGE AND ORGANIZATIONAL PERFORMANCE

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ABSTRACT

Information technologies have become pervasive in various organizational functions. However, their usage impacts organizational performance in various manner, and it depends on the intensity of information technology usage. Human resources information systems (HRIS) are widely used in various organizations. Previous research investigated impact of HRIS to organizational performance, but on the country level and from the adoption perspective. In this work, we focus on the intensity of HRIS usage in organizations and their impact on organizational performance. In order to investigate this relationship, we develop several regression models, using the global dataset with large number of companies worldwide. Research results revealed that the strongest impact to organizational performance is attained through the intensity of HRIS usage, measured by the number of different functionalities available in the software systems. However, this could also be the result of overall development of organizational management and its impact on organizational performance.

KEY WORDS

information systems, human resource management, human resources information systems, HRIS

CLASSIFICATION

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INTRODUCTION

Unpredicted, fast pacing changes of business conditions, force organisations to organize internal organisational environment to quick adaptation and responses with innovative approaches and reduced time to globalised market [1-3]. Under those new business challenges, the human resources management (HRM) function within organisation, having increasingly critical role, it is required to develop instruments to analyse social, economic, political, legal, and technological environment opportunities in order to restructure old HR roles and responsibilities and design new HRM strategies, policies, programmes and processes being the key success factors to the organization's business success [3-5]. In that sense, in the recent past, HRM is facing significant transformations, transiting from the administrative management practices to the position of a strategic partner in developing and supporting organisation's strategy [1, 2, 6].

The fast evolution and extended use of ICT in the field of knowledge management has deeply affected the organisational HRM strategy and its implementation by boosting the transformation of human resources (HR) processes and practices in terms of collecting, storing, using, and sharing information [3, 5, 7].

In the same time, ICT increasingly makes HRM processes to be more efficient and allows their greater involvement in the business strategy, which in return adds significant changes to HRM function [6, 8]. Shifting its focus to knowledge sharing and strategic workforce analysis HRM became an unavoidable contributor to the strategic management of organizations [5, 9].

Therefore, due to the fact that use of ICT strongly impacts the performance of human resources, organizations ever more strongly rely on the use of human resources information management systems as the instrument for realisation of organisational objectives and achieving competitive advantage [5, 10-12].

Although the reasons for adoption of HRIS may vary among the organisations, empirical research shows that three main potential benefits of implementing HRIS in the organisation are; operational efficiency, relational impact changing the nature of the relationship between HR, line managers and employees, and transformational impact changing HRM role in the business environment [13-15].

The goal of the research is to investigate the impact of intensity of HRIS usage on organizational performance using The Cranfield Network on International Human Resource Management (CRANET) survey conducted on a global sample of countries. Several multiple regression models have been developed, with various measures of organizational performance as dependent variables, and with various aspects of HRIS implementation as independent variables. Results indicate the strong relationship between HRIS implementation and organizational performance worldwide. The main contributions of this research are the utilization of CRANET dataset in evaluation of HRIS impact to organizational performance and focus to the intensity of HRIS usage in worldwide organizations, which sheds additional light to the issue of overall relationship of information technologies and organizational competitiveness.

The article is structured as follows. After the introduction, we present the notion of HRIS and discuss its impact on organizational performance from the perspective of pervious research. The methodology is presented, in terms of data, variables and statistical methods used. Main research results are outlined and discuss, and paper finishes with the conclusion section.

LITERATURE REVIEW

The Human Resource Information Systems (HRIS) is described with a large number of various definitions, but none of them is commonly accepted [2]. Majority of definitions

introduce different stages of HRIS development, different approaches to cost and benefits calculation and influence to various human resource management (HRM) functions and relationship [6, 16]. One of numerous definitions considers HRIS as a method of performing organizational HR strategies, policies, and practices by introducing and with full-scale support of information technologies [3, 9, 17].

The concept of HRIS is understood as “the adoption of technology in delivering Human Resource (HR) practices due to the digital revolution in the world is such a tool that organizations can employ to manipulate the performance and behaviour of the people on whom they rely on to achieve business success” [2, 5, 18].

In principle, HRIS represents the integration of HRM and Information and communication technologies (ICT) [4, 19, 20]. Thereby, some researchers regard HRIS as distinctive information system intended to facilitate and support HRM activities such as planning, administration, decision-making, and control [2, 21], while other consider HRIS as a way of executing HRM policies, programmes and transactions in organisations by using information technology [22-24].

Using ICT systems organisations can effectively administer and monitor a large number of HR processes providing in that manner strategically significant information and knowledge, and thus contributing to the achievement of organisation’s competitive advantage [4, 5, 9].

A number of HRIS studies highlight the transformational potential of human resource management within organizations and its strategic significance in modelling superior organisational performance and thus achieving competitive advantage [24, 25]. Consequently, investment in HRIS in terms of organisational objectives enables simplification and cost reduction of HRM activities, enhanced effectiveness of HRM service delivery and transformation of the HRM to a strategic business function [9, 15]. Recent ICT development enables the design of HRIS platform operating in real-time information-based, self-service, and interactive work environment [5, 26].

Among other characteristics, such a platform streamlines and supports HRM operations such as recruitment and employee selection, payroll, and benefits management, education and training administration and monitoring, career-planning, and performance appraisal and management [19, 27, 28]. HRIS also contains features such as employees and managers skill testing, assessment and development, résumé processing, applicant tracking, team and project management, employee involvement and self service management, organizational communication, and, as well, management development [20, 29].

Due to its complexity and costly adoption, an HRIS system requires a detailed need analysis and carefulness in investment decision for organisations of all sizes [1, 11, 30]. Various research studies repeatedly cite that in general, benefits of using HRIS in organisations lead to improved quality of services, enabling timely and fast access to information, and cost reduction related to planning, operating, and controlling HR activities [13, 26, 27].

As a result of their research on usage of HRIS in organisations, Kovach et al. [18] have found some administrative and 28 strategic advantages, while Beckers and Bsat [31], in their study about HRIS, recognized five reasons motivating organisations to adopt HRIS, such as (i) increase competitiveness by improving HR practices, (ii) produce a greater number and variety of HR operations, (iii) shift the focus of HR from the processing of transactions to strategic HRM, (iv) make employees part of HRIS, and (v) reengineer the entire HR function.

Research results present also that organisations are adopting HRIS technology as a platform to enable transformational change, improve the quality of HR processes and practices, allow distributed access to services for both employees and managers and provide improved

support to decision making processes [26, 32]. Several studies distinguish operational, tactical, and strategic dimensions of HRIS, where operational HRIS provides data to support routine and repetitive HR decisions, tactical HRIS provides data for support decisions related with allocation of resources, and strategic HRIS provides data for strategic decisions in human resources planning [27, 28, 33]. In that sense, as some authors have observed, HRIS should enable HRM function to simultaneously perform activities in flexible, strategic, client-focused and cost effective manner, and at the same time, increasing productivity, accelerating response time, improving decision making processes and enhancing client service quality [9, 14, 19].

According to the research of several authors, HRIS is essentially used for business process improvements, development and utilization of talent management processes, evolution of workforce metrics, HR strategy development, workforce management and planning, and competency management [7, 8, 34, 35]. Thereby, an essential quality of modern HRIS platforms is establishing of databases which can produce timely, accurate, appropriate and detailed information, providing the management with an effective decision analysis apparatus and thus enabling them to influence business processes and strategies [6, 19, 30]. As a result, HRIS contributes to the establishing a data driven HRM strategies enabling it to transform its tactical and reactionary role into strategic one [28, 34].

In the recent past, a number of studies have put emphasis on the type of applications predominantly used in HRIS, conditions required for the successful implementation of HRIS, and requirements are supporting successful HRIS [19, 25, 32]. In a sense, some researchers recognize the usage of HRIS as “unsophisticated” one dealing with low level of administrative HR services such as payroll, benefits administration, employee and absence records and “sophisticated” use delivering services in terms of selection and recruitment, training and development, career development, HR planning and performance appraisal [15, 30]. Adoption and implementation of HRIS in the organisation contributes not only to the efficiency and improved quality of HR practices, but can also support transformation of HRM in becoming a strategic partner [28, 34, 36].

Reporting the research results on adoption and use of HRIS, some studies have found that ICT enables the strategic transformation of HRM [24, 32, 37], while other claim that such strategic impact is missing [26, 38, 39]. According to Barrett and Oborn [40] and Arthur and Boyles [14], such arguable findings are coming because of unclear meaning of term “being strategic”.

As recent literature suggests, recent trends in the development of HRM applications are the transformation of traditional HRM or HRIS into internet based HRM (e-HRM) [19, 31, 34]. Thereby, the basic difference between HRIS and e-HRM consists in the fact that HRIS is intended to support for those using services of organisation’s HR function [6, 41], while, in contrary, e-HRM is an internet-based platform available to all the employees at all organisational units [10]. In that respect, HRIS can be considered as a part of e-HRM to the extent it uses internet technologies, where e-HRM is more extensive concept not restricted to persons or processes operating HR function [12, 26, 37]. From another side, the distinction between HRIS and e-HRM can be explained as a transition from the digitalisation of HR processes to digitally arranged and procured data for that processes and functions [20, 35].

Examining the usefulness of HRIS researchers distinguish two extremes; the entirely administrative use of HRIS for daily HR operations and its strategic use for support to decision making processes [31, 32, 37]. It is obvious that both dimensions of HRIS are contributing to the increase of organisation’s performance, where administrative HRIS operations are much more productive when used with ICT support, while in contrary, the possible benefits of strategic HRIS is more demanding to justify and measure because of uncertainty that the benefits can be considered as direct result of strategic deployment of HRIS [12, 35, 38].

There are still missing clear, effective and unambiguous methods for measuring the contribution of HRIS to the organisation value [10, 20, 25]. Among other measures, effectiveness of administrative HRIS can be measured by cost reduction, while, regarding the strategic HRIS, it is difficult to measure HRIS's share in the return on investment (ROI), enhanced employee communications and certain productivity improvements within the HRM function [17, 32, 37].

However, organisations increasingly use the strategic dimension of the HRIS, like one of answers to the competitive pressure [16, 32]. There are studies suggesting that adoption of HRIS corresponds to the effects such as streamlining and simplifying of HR processes, increasing efficiency, faster hiring and decreasing of administrative staff in the HR department [17, 21, 28, 31].

According to the studied literature, it is possible to point out that there is a significant relationship between adoption of HRIS and HRM effectiveness also affecting organisational performance [17, 33, 35].

Some authors give attention on the notion of HRIS as an essential part of any multifaceted organizational information system [20, 25, 36]. They suggest that HRIS is characterised with extensive collaboration between people, structures, strategies, processes, and information, but not depicted exclusively as computerised HR related programmes or tasks [15, 32].

METHODOLOGY

DATA

The Cranfield Network on International Human Resource Management (CRANET) as a network of business schools from about 40 countries, existing since 1989, has been established to collect and analyse data and information on best HR practices and comparative organisational performances in the Europe and globally [42]. With Cranfield School of Management as the network coordinator, CRANET is world leading network of researchers in international HRM, covering all aspects (theoretical and practical) of the HRM domain. Within CRANET, important, representative data on HRM and organisation performance are collected continually, and meticulous scientific analysis is performed providing superior quality results to academic community, interested professionals, different government and international bodies and institutions.

In order to provide data for interested parties, CRANET network conduct on a regular basis, international surveys exploring organisational policies and practices of HRM function internationally. Surveys include specific sets of questions divided into sections about organisation's operations [1].

For the research purpose, the organization is the unit of analysis, and the key respondent is highest manager of HR department, which is aligned with guidelines suggested by Arthur and Boyles [14] regarding identification of key informants for exploring HRM at the organizational level. The questionnaire is developed intentionally to provide factual information about the HRM and HRIS in the organization, not containing questions allowing subjective judgments about the organisation. Among other questions, the questionnaire contains a set of questions examining HRIS use and sophistication. The data collected are intended to represent population in the country regarding the industry and organisation size. The time for collecting the data usually spans an eighteen-month period. The surveys are carried out every three-four years covering about 36 countries with more than 7 000 companies while usual response rate across countries ranges from 5% to 86% [1].

Before each round of conducting the survey, the questionnaires are redesigned in order to satisfy increasing number of participating countries and multicultural aspects of research.

Regarding the respondent organisation size, the threshold has been set to more than 200 employees due to the fact that studies suggest that smaller size organisations incline not to have specialised HRM department. The exception is made for the smaller countries setting the threshold to more than 100 employees [42].

Although the number of participating countries continually grows and processing of collected data becomes more intense and increasingly successful, evidence begins to emerge that such a questionnaire is lengthy and very complex causing decrease in the number of respondents, but also the world economic situation can aggravate conditions for work.

Regarding the nature and mode of operation in CRANET network, each network member collects on its own and processes its own data. It does not prevent cooperation with other countries, but the use of other members' data is subject to the approval of that particular member, whereby no one member can be forced to collaborate. The fact is that cooperation between partners is alive and that network partners share survey data and results developing a body of knowledge on comparative HRM.

In this research, the CRANET Survey Research Instrument has been being used, that contains questions relevant for this survey. Available CRANET dataset is based on the survey conducted globally in 2012 representing relevant sample of corporations. Dataset consists on the sample of 32 countries on all of the continents (Australia, Hungary, South Africa, Austria, Iceland, Sweden, Belgium, Ireland, Switzerland, Bulgaria Israel The Netherlands, Cyprus (including the Turkish Cypriot Community), Japan, Taiwan, Czech Republic, Lithuania, UK, Denmark, Norway, Uruguay, Estonia, Philippines, USA, Finland, Russia, France, Serbia, Germany, Slovakia, Greece, and Slovenia).

However, data is available for 23 countries that sent 37 855 questionnaires and received 3 704 questionnaires, resulting in a response rate of 9,8%. A total number of questionnaires received from 32 countries was 6 258, and that forms a representative sample for the analysis.

STATISTICAL ANALYSIS

Seven multiple regression models were generated with the following dependent and independent variables, presented in Table 1. Organizational performance is measured with the seven measurements: service quality, level of productivity, profitability, and rate of innovation. Respondents evaluated the organizational performance using the scale from 1 (poor or at the low end of the industry) to 5 (superior).

Independent variables were related to HRIS usage, HRIS type, HRIS outsourcing, HRIS self-service, and employee self-service. In addition, various types of HRIS usage were measured, and the sum of various HRIS usages in companies is used as one of the independent variables.

Company size, market size, market growth, and industry type were used as control variables. Therefore, seven regression models were developed.

Table 1. Dependent variables used in regression models. Source: Authors' work, based on CRANET survey.

Variable	Measurement
Dependent	
Service quality (OP1)	(1 – Poor or at the low end of the industry, ... 5 – Superior)
Level of productivity (OP2)	
Profitability (OP3)	
Rate of innovation (OP4)	

Table 2. Independent variables used in regression models. Source: Authors' work, based on CRANET survey.

Variable	Measurement
Independent	
HRIS usage (HRIS_USAGE)	0-HRIS is not used in an organization, 1-HRIS is used in an organization
HRIS types (HRIS_TYPE)	HRIS_TYPE_1- A number of separate stand alone HRIS tools, HRIS_TYPE 2- A single, primarily independent HRIS, HRIS_TYPE 3- Primarily interfaced/integrated into a wider management information systems
HRIS Outsourcing (HRIS_Out)	Hris_Out_1-Not outsourced, Hris_Out_2-Outsourced to a small extent, Hris_Out_3-Partly outsourced, Hris_Out_4-Outsourced to a large extent, Hris_Out_5-Completely outsourced
HRIS Manager self-service (HRIS_MSS)	1- Manager self-service (online tools whereby managers can complete HR processes) is used, 0-Not used
HRIS Employee self-service (HRIS_ESS)	1-Employee self-service (online tools whereby employees can access personal information and perform simple HR tasks such as maintaining personal data) is used, 0-Not used
HRA1 – HRA12 – various HRIS purposes	HRA1 Individual personnel records; HRA2 Payroll; HRA3 Benefits; HRA4 Time registration and attendance; HRA5 Recruitment and selection; HRA6 Training and development; HRA7 Performance management; HRA8 Career planning / Succession planning; HRA9 Work scheduling; HRA10 Health and safety; HRA11 Measurement of HR performance (HR metrics); HRA12 Provide HR information, policies and practices
Number of HRIS usages	Sum of variables HRA1 to HRA12

Table 3. Control variables used in regression models. Source: Authors' work, based on CRANET survey.

Variable	Measurement
Control	
Size	Micro (< 10 employees); Small (< 50 employees); Medium (< 250 employees); Large (> 250 employees)
Market size	Local; Regional; National; Continent-wide; World-wide
Market growth	Growing; Same; Declining
Industry	The industry type is measured using NACE 2007 classification.

RESULTS

Table 4. presents the regression analysis summary for the organizational performance as dependent variable according to significance level. All the regression models had rather a low level of R-square, indicating that the variance in dependent variable could be explained by the variance in independent variables with the 4,7% (service quality), 5,8% (level of productivity, 5,4% (profitability) and 6,6% (rate of innovation).

Most of the organizations from the global sample (87,75%) used the HRIS in their day-to-day work. Therefore, it is not surprising that this variable was removed from the sample due to the collinearity. Different types of HRIS also did not have any impact that would be statistically significant, and the same refers to HRIS outsourcing. However, a different

number of HRIS usage had a strong positive statistical impact on all measures of organizational performance, which indicates a clear positive relationship between HRIS usage intensity and organizational performance. HRIS manager self-service did not have a statistically significant impact on any of the measures of organizational performance. However, HRIS Employee self-service did have a strong positive impact to rate of innovation at the 1% level.

Table 4. Multiple regression model of HRIS impact to organizational performance (regression coefficients; adjusted R-square). Source: Author's work based on CRANET survey.

Variable group	Variable modalities	Dependent variables			
		OP1	OP2	OP3	OP4
Independent variables					
HRIS usage		<i>a</i>	<i>a</i>	<i>a</i>	<i>a</i>
HRIS types	HRIST_TYPE_2	-0,005	-0,046	0,015	-0,003
	HRIST_TYPE_3	-0,014	-0,019	-0,022	-0,028
HRIS outsourcing	Hris_Out_2	-0,015	-0,010	0,070	-0,013
	Hris_Out_3	-0,070	-0,038	0,020	-0,015
	Hris_Out_4	0,002	-0,027	0,019	0,024
	Hris_Out_5	0,022	0,039	0,045	-0,002
Number of HRIS usages		0,023***	0,041***	0,030***	0,038***
HRIS Manager self-service		0,043	0,022	0,026	0,031
HRIS Employee self-service		-0,031	-0,007	0,021	0,085**
Control variables					
Size	Small (< 50 emp.)	-0,300	-0,228	-0,267	-0,761***
	Medium (< 250 emp.)	-0,344	-0,229	-0,089	-0,628***
	Large (> 250 emp.)	0,351	-0,272	0,004	0,586**
Market size	Regional	-0,115	-0,182***	-0,044	-0,128
	National	0,206***	0,234***	0,122**	0,157***
	Continent-wide	0,215***	0,299***	0,134	0,221***
	World-wide	0,261***	0,369***	0,323***	0,378***
Market growth	Same	0,021	0,065	0,134***	0,096**
	Declining	-0,177***	-0,216***	-0,272***	-0,276***
Industry	B. Energy and water	-0,008	-0,002	-0,054	0,034
	C. Chemical products	-0,076	0,015	-0,145	-0,061
	D. Metal manuf.	-0,127	-0,002	-0,147	0,207
	E. Other manuf.	0,024	0,085	-0,128	0,271
	F. Building	0,096	0,154	0,052	0,167
	G. Retail and distribution...	0,043	-0,009	-0,096	0,087
	H. Transport & Communication...	-0,017	0,026	-0,175	0,080
	I. Banking; finance; services	0,115	0,106	0,041	0,116
	J. Personal, domestic...	0,075	0,302	0,373	0,487**
	K. Health services	0,115	0,111	-0,110	0,392**
	L. Other services ...	0,046	0,092	-0,177	0,360**
	M. Education...	0,106	0,305**	-0,220	0,418***
	N. Social Services	0,123	0,210	-0,106	0,315*
	O. Public administration	-0,065	0,131	-0,381**	0,134
Other	0,132	0,249**	0,038	0,378***	
Constant		3,811***	3,196***	3,012	3,202***
Adjusted R-square		0,047	0,058	0,054	0,066

***statistically significant at 1 %

**statistically significant at 5 %

*statistically significant at 10 %

a – omitted because of collinearity

Overall, the rate of innovation was higher for the large companies, but small and medium size had a negative impact on rate of innovation. Regional market size overall had a negative impact on the rate of productivity, while national, continental and world-wide markets had a positive impact on all measures of organizational performance. Declining markets had overall negative impact on organizational performance, while at least same level of market growth had positive impact on productivity and rate of innovation. Impact of various industries was different from organizational performance, but it is interesting that companies operating in tertiary sector (industries J, K, L, M) had overall higher rate of innovation.

CONCLUSION

The main purpose of this research was to contribute to the better utilization of HRIS usage in organizations. The research outcomes may also help in improving the approaches used in HRIS usage in organizations, with the goal to maximize its impact on organizational performance. A part of the main objective was achieved through study of the available literature on ICT, HRM and particularly on HRIS. By exploring sources was possible to define the critical factors that influence both HRIS and overall organizational performance, determine substantial differences of HRIS impact to organizations according to HRIS type and number of areas in which HRIS is implemented, availability of self-service, and consequences and impact of outsourcing.

We have conducted a regression analysis, using CRANET database, with goal to investigate the impact of HRIS usage intensity on organizational performance. Four measurements of organizational performance were used: perception of the service quality, level of productivity, profitability, and rate of innovation. Different aspects of HRIS usage were taken into account, and the following variables had a statistically significant impact to the organizational performance: HRIS usage intensity measured by the number of HR usage functions available in HRIS, such as Individual personnel records, Payroll, Benefits, Time registration and attendance, Recruitment and selection, Training and development, Performance management, Career planning / Succession planning, Work scheduling, Health and safety, Measurement of HR performance (HR metrics), and Provide HR information, policies and practices. It seems that companies that have HRIS with more HR functions are overall more productive, innovative and produce better service quality, which results in overall higher profitability. This could also indicate that companies are becoming more efficient in transferring their HR practices through the information system, which is more evident for larger companies, operating on larger markets, which are growing or at least stagnating. Therefore, companies can make better efforts in incorporating more of their HR practices in HRIS. This result could also be useful to companies that develop HRIS so that they can cooperate more intensively with the users of their systems in order to better reflect their HR practices in information systems. However, it is also possible that the usage of HRIS incites companies to enhance their HR practices, which should be investigated in future research, with qualitative methodologies, such as longitudinal case studies of companies with modest HR practice which adopted HRIS with more developed HR functions. It would be worthwhile to investigate, in addition, which factors support the companies to use all the options available in HRIS and to maximise its positive impact to organizational performance.

This research has several limitations that stem mainly from the limitations of CRANET database and structure of the survey questions. Therefore, our results could be tested in future research using different research instruments and different research approaches, such as longitudinal case study research.

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