

Information Technologies in Human Resources Management: An Overview

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Abstract. Human resources management is one of the most important areas that influence business performance. Information technologies applied within an organization brings integration of business processes and enables their functionality. Synergy of human resources management and application of information technologies is core architectural component of an organization that brings value to organizational processes outcomes. Therefore, it is of a great interest to determine their mutual influence. There are two mayor research perspectives of human resources management synergy with information technologies, that are presented in this paper: implementing information technologies in human resources management and influence of human resources management to information technology related projects and companies.

Keywords: human resources management, information technologies, application.

1. Introduction

Human resources management (HRM) is one of crucial areas in a company management and it directly impacts quality of business process results and performance [1]. "People add value to a firm to the extent that they will perform future services. Some of this value is added directly by transforming the firm's product, but much of it is less tangible, consisting of solving problems, coordinating the work of departments and exercising judgment in novel situations" [2]. Therefore, it is of a strategic importance to carefully deal with human resources i.e. human capital [2]. "HRM, once responsible for record-keeping and maintenance, has evolved into a strategic partner, sharing comparable boardroom status with disciplines such as accounting, marketing, and finance" [3].

Applying information technologies within organizational Business Information System (BIS) enables the integration of business processes and support in making decision, via data collection, flow, processing and visualization.

Furthermore, the implementation of BIS could support the monitoring of strategic decisions implementation and transformation of organizations [4]. Human Resources are considered (parallel with Equipment and Material Availability) as one of the most important aspects in establishing the best functionality within the Advance Planning System (APS) of an organization (particularly in productive companies such as factories).

It is of a great importance to determine the existing practices in implementing information technologies with HRM, as well the influence of HRM to IT related projects and companies. This synergy of HRM and IT is presented in this paper.

2. Human Resources Management – Concepts and Research

Basic concept of human resources management is the concept of “human capital”, that is related to “skills, experience and knowledge that have economic value to establishment” [2]. “Human capital is the result of a firm’s making a deliberate investment either through hiring certain individuals “on the market” or developing them in-house.” [2] According to [2], it is of a great importance to emphasize that human capital is not owned by a company, but it is embodied in employees, who are free to move from one firm to another. For employees that stay with a firm, their contribution depends on their willingness to perform their abilities. So, investments in control of employees’ performance, their retaining, empowerment with additional education and motivation is also considered as human capital investments.

Research in the field of Human Resources Management is widely represented in review papers, as well as in papers related to particular areas [3]. Research topics are related to evolution of HRM function, cross-functional approaches, particular industrial psychology topics, as well as related to particular functional tasks such as selection, training, compensation, motivation and performance monitoring. “Strategic, international and political perspectives of HRM represent three of the most significant areas of practical and theoretical concern on which theory and research in HRM has focused in the past decade and a half.” [3]

Strategic perspective of HRM links human resources with the strategic needs of the business. In [5], the 5-P model of strategic human resources management is described with many activities within the five P’s (HR Philosophy, Policies, Programs, Practices and Processes). Empirical research in [6] shows technical and strategic human resource management effectiveness as determinants of firm performance. In [7], Total Quality Paradigm applied in HRM is presented (Table 1). Aspects of measuring human resources, with approach based on Balanced Scorecard, are presented in [8]. Elements of control theory with administrative information for the purpose of strategic human resource management are presented in [10].

Table 1. Evolution of Total Quality Paradigm in HRM [7]

Corporate Context Dimension	Traditional Paradigm	Total Quality Paradigm
Corporate Culture	Individualism Differentiation Autocratic leadership Profits Productivity	Collective efforts Cross-functional work Coaching/enabling Customer satisfaction Quality
Human Resource Characteristics	Traditional Paradigm	Total Quality Paradigm
Communications	Top-down	Top-down Horizontal, lateral Multidirectional
Voice and involvement	Employment-at-will Suggestion systems	Due process Quality circles Attitude surveys
Job Design	Efficiency Productivity Standard procedures Narrow span of control Specific job descriptions	Quality Customization Innovation Wide span of control Autonomous work teams Empowerment
Training	Job related skills Functional, technical	Broad range of skills Cross-functional Diagnostic, problem solving Productivity and quality
Performance Measurement and Evaluation	Productivity	Productivity and quality
	Individual goals Supervisory review	Team goals Customer, peer and supervisory review
Rewards	Emphasize financial performance Competition for individual merit increases and benefits	Emphasize quality and service Team/Group based rewards
Health and Safety	Treat problems	Financial rewards, financial and nonfinancial recognition Prevent problems Safety Programs Wellness Programs Employee assistance
Selection/Promotion Career Development	Selected by manager Narrow job skills Promotion based on individual accomplishment Linear career path	Selected by peers Problem-solving skills Promotion based on group facilitation Horizontal career path

3. Related work

Review efforts in systematization of research and practical solutions resulted in several published review papers, such as [11]. Innovative solutions in HRM that are proposed in [11] are related to decision support system, i.e. expert system application MATCH, that enables selection of team members, answering to one of questions: “Which combinations of people and skills will produce the most productive teams in our major business divisions?”

Research on usage of information technologies in [11] is conducted with questionnaire that was organized to reveal answers regarding efficiency of HR IT tools, reaching strategic goals with using HR IT tools and covering of HR area by IT tools. It has been shown (Fig.1) that IT is mostly used in career management segment of HR processes, while other most used segment is recruiting.

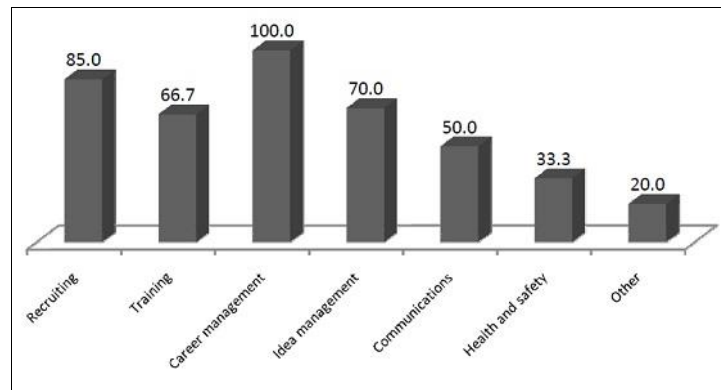


Fig. 1. Impact of HR IT tools regarding HRM areas [11]

Recently, the concept of e-HRM systems has been widely used [12]. Application areas include payroll [13], “recruitment and selection, development and training, employee assessment, motivation, talent management, personnel service” [12] (Fig.2).

Generally, IT solutions for HRM support could be categorized as:

- External/International (giving support mostly to recruitment)
- “In-house” solutions, giving support to the whole “life-cycle” of an employee, from personal records, payroll, training, work quality monitoring, to retirement.

One of the most important activities in HRM is recruiting, where on-line i.e. “e-recruiting” systems have important role [13]. One of the main functions of e-Recruiting systems is gathering and centralization of information about potential employees and employers, with matching mechanisms and mutual exchange of information in aim to help companies find the best job candidates and help candidates present themselves and find appropriate job. In [13] there are several types of e-Recruiting systems presented (Table 2). Of course, today one of the most used general-purpose job boards within professional social network is LinkedIn [14], while other similar web applications try to

enhance functionality and gain respect and trust from job seekers, such as Opportunity [15] and others.

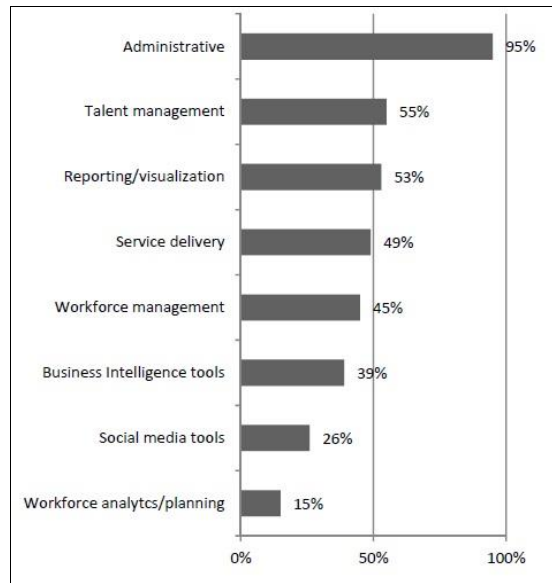


Fig. 2. Application e-HRM solutions in USA enterprises [12]

Table 2. Types of e-Recruiting systems and examples [13]

E-recruiting source	Advantages	Disadvantages	Sample participants
General-Purpose Board	Job Brand recognition, E-recruiting experience, High traffic, Industry best tools, Large candidate base, Large recruiter base	Relatively high job posting cost, Potentially low-quality applications, Limited content control, Stickiness of the job board, Limited candidate relationship	Monster.com, HorJobs.com, CareerBuilder.com
Niche Job Board	Gathering of passive job seekers, focused search, community of professionals	Low brand recognition, possibility of identity theft	Dice.com, Erexchange.com, Taonline.com, JournalismJobs.com, MarketingjJbs.com, TexasJobs.com
E-Recruiting Application Provider	Low application development cost for recruiters, Quick application development	Integration issues with existing systems, Possibility of closeout due to competition, possibility of lock-in, low traffic	Recruitsoft, Brassring, RecruitUSA, PeopleClick, TalentFusion, Lawson
Hybrid	Recruiting Expertise	in	Strong image as a New York Times,

Service Providers	advertising industry, portfolio of recruiting media, price bundling with conventional media	conventional media, low traffic, low technology	Wall street Journal, Chronicle of Higher education
E-Recruiting Consortium	Low service cost, direct and immediate link to corporate career site	Potential conflicts among members, low exposure, low technology	DirectEmployers.com, NACElink
Corporate Career Web Site	Candidate relationship management, High interest in jobs by job applicants, Integration with existing systems	Needs for IT specialists, High upfront development cost	94% of Fortune 100 Companies, 81% of Fortune 500 companies

Important aspect of HRM and IT synergy is answering the question: “How application of information technologies affects human resources and human resources management?” Actual impact of using information technologies by human resources professionals is examined in [16]. It has been shown that more extensive use of IT enables HR professionals to make greater use of external professional links, to have increased information responsiveness by HR professionals and HR professionals have greater information autonomy.

Another important aspect of application of HRM in IT business sector is answering the question: “How HRM influences IT business or IT projects performance?”. Analysis of the role of human resources management in information technologies has been presented in [17], where special concern is given to questionnaire based analysis of factors influencing success of IT projects. Results are given in Table 3.

Table 3. Some HRM factors affecting IT project performance [17]

INDIVIDUAL FACTORS	JOB FACTORS	ORGANIZATIONAL FACTORS
Accountability and deep sense of responsibility	Necessary education and research opportunities	Fair and adequate salary and compensation
IT knowledge and ability	Timely improvement of organizational structure and redefining of jobs (appropriate with IT changes)	Suitable environment
Passion and interest for the job	Adequate job knowledge and describing of the duty	Awareness of the IT director of the type of specialist activities of the staff
Good work ethics and attitude	Highlighted role in giving services	Attention to professional and general education programs
Having a spirit of teamwork	Having work respect and dignity with others	More attention to job security and official employment
Appropriateness of the individual spirit with many changes in IT	No conflict of roles, duties and responsibilities	To create conditions for continuing education
Having the spirit of	Opportunities to do group	Opportunities to rest and

knowledge and skills transfer to others	work and participation in tasks	avoid work stress
Passion and interest to the workplace	Having a role in decision-making	More attention to the experience and knowledge of the staff in professional fields
Work background and experience	Lack of monotonous and repetitiveness	Participation of IT staff in exhibitions and organizing work camps

Some important factors, from the experts perspective [17] related to IT project success impact are: Attention to personality characteristics in hiring project team members; Abilities of technical staff; Salary and sufficient wages; Anachronism of IT managers in being aware of high speed of changes in information and communication technologies; Managerial and technical knowledge of IT managers; Appropriate work environment; Using IT tools for management of IT related projects.

4. Preliminary empirical research

Since the recruitment is one of the most important areas in HRM, it has been emphasized in this empirical research. The main problem of e-Recruiting systems to job candidates and employers is lack of pre-interview personal contact in aim to be acquainted with organizational culture of the company and personal characteristics of candidates. Therefore, companies contact universities to meet students and present themselves as potential companies of their employment and even “talent seeking” or “job offering” agencies are helping companies and candidates in their efforts. For the same purpose, job fairs are organized, such as IT related job fair and conference IT Konekt [18].

Main research questions in this empirical research are related to synergy of HRM and IT related to job candidates recruitment from both perspectives: 1) Importance of HRM to IT company success; 2) Use of IT in HRM.

Sample for this empirical research consists of 22 companies that were presented at IT Job fair and conference IT Konekt on 20-21 May 2016 in Belgrade. Each of these 22 companies was interviewed with questionnaire related to previously defined research questions.

Key findings of this preliminary empirical research, according to previously set research questions are:

1) Importance of HRM to IT company success - Each company has human resource officer and each company has HR related questions at interview. 80% of companies equally value personality aspect and technical knowledge and skills aspect of candidates during interview process, 10 % of companies emphasize personality and 10% of companies emphasize technical knowledge and skills. 10% of companies have “one-day” interview and simple process of HRM and Technical interview part, while 90% companies have “multiple-day” interviews with duration of 1/4 of personality and communication tests, while 3/4 of interview time are technical oriented tests, interviews and case studies.

2) Use of IT in HRM – Each company has web site and career part of official company website as well as appropriate LinkedIn company profile. As a first step in interview process, only 5% of companies use “phone” interview with using video conferencing tool such as Skype, while 10 % of companies use technology-oriented on-line tests with questions and work assignments. Most companies require personal attendance of job candidates during full process of interview.

5. Conclusion

Aim of this paper is to explore synergy of HRM and IT in success of a company. Particular concerns are given to the role of HRM in Total Quality Management and the role of using IT in HRM. Summary review results are presented regarding the use of IT in HRM generally, but particularly the process of recruiting is emphasized as one of crucial business processes in HRM.

Synergy of HRM and IT in a company is presented from two perspectives – influence of IT to HRM success and influence of HRM to IT related projects and companies success. Preliminary empirical research in particular field of recruiting is conducted with 22 IT companies regarding both perspectives. It has been shown that, within the specified sample of companies, all companies use the same type of IT related HRM tools for recruiting. Most companies equally value personality and technical skills, while, during interview, most companies dedicate approximately $\frac{1}{4}$ of total interview time to personality and communication skills tests.

References

1. Huselid, M.: The impact of human resource management practices on turnover, productivity, and corporate financial performance. *Academy of Management Journal*, Vol. 38, 635–672. (1995)
2. Snell S.A., Dean J.W.: Integrated Manufacturing and Human Resource Management: A Human Capital Perspective. *The Academy of Management Journal*, Vol. 35, No. 3, 467-504. (1992).
3. Ferris G.R., Hochwarter W.A., Buckley M.R., Harrel-Cook G, Frink D.D.: Human Resources Management: Some New Directions. *Journal of Management*, Vol. 25, No. 3, 385-415. (1999)
4. Henderson J.C., Venkatraman N.: Strategic alignment: Leveraging information technology for transforming organizations. *IBM Systems Journal*, Vol. 32, No. 1, 472-484. (1993)
5. Schuler R.S.: Strategic Human Resources Management: Linking the People with the Strategic Needs of the Business. *Journal Organizational Dynamics*, Vol. 21, No. 1, p18. (1992)
6. Huselid A. M., Jackson S.E., Schuler R.S.: Technical and Strategic Human Resource Management Effectiveness as Determinants of Firm Performance. *Academy of Management Journal*, Vol. 40, No. 1, 171-188 (1997)
7. Blackburn R., Rosen B.: Total Quality and Human Resources Management: Lessons Learned from Baldrige Award-winning companies. *Journal Academy of Management Executive*, Vol. 7, No. 3 (1993)

8. Ulrich D.: Measuring human resources: An Overview of Practice and a Prescription for Results. *Journal Human Resource Management, Special Issue: Measuring Human Resource Effectiveness and Impact*, Vol. 36, No. 3, 303-320 (1997)
9. Snell S.A.: Control Theory in Strategic Human Resource Management: The Mediating Effect of Administrative Information. *The Academy of Management Journal*, Vol. 35, No. 2, 292-327 (1992)
10. Broderick, R., Boudreau, J. W.: *Human resource management, information technology, and the competitive edge*. Ithaca, NY: Cornell University, School of Industrial and Labor Relations, Center for Advanced Human Resource Studies. (1991)
11. Mamoudou, S., Joshi G.P.: Impact of Information Technology in Human Resources Management. *Global Journal of Business Management and Information Technology*, Vol.4, No. 1, 33-41 (2014)
12. Karasek A.: Information Technologies in Human Resources Management – Selected Examples. *International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering*, Vol. 9, No. 6 (2015)
13. Lee I.: An Architecture for Next-Generation Holistic e-Recruiting System. *Communications of the ACM*, Vol. 50, No. 7, 81-85 (2007)
14. General Purpose e-Recruiting system LinkedIn, www.linkedin.com
15. General Purpose e-Recruiting system Opportunity, <https://myopportunity.com/>
16. Gardner S.D., Lepak D.P., Bartol K.M.: Virtual HR: The Impact of Information Technology on the Human Resource Professional. *Journal of Vocational Behavior*, Vol. 63, 159-179 (2003)
17. Tohidi H.: Human Resources Management Main Role in Information Technology Project Management. *Journal Procedia Computer Science* 3, 925-929 (2011)
18. Job fair and professional conference IT Konekt. Available: www.it-konekt.com (visited May 2016)