

# IT Competence, HR Roles and Job Performance



Hung-Yue Suen, Jiann-Min Yang  
National Chenchi University  
Department of Management Information Systems  
No.64, Sec. 2, Zhinan Rd  
Taipei City  
Taiwan  
[ollin.suen@msa.hinet.net](mailto:ollin.suen@msa.hinet.net), [jmyang@mis.nccu.edu.tw](mailto:jmyang@mis.nccu.edu.tw)

**ABSTRACT:** *The purpose of this paper is to explore the relationship between IT competence and job performance by different HR roles. A research model was formulated, based on two theories from both technology-to-performance chain (TPC) model and the HR five-roles model. The study used multiple hierarchical regression approach, in which 122 HR professionals within 8 financial companies participated. The study found that IT competence positively influenced the job performance of the HR professional, while the net explanatory power and the impacted IT competency factors were different for different HR role. These findings contribute to research related to IT competence and an expanded understanding of the factors that improve an HR professional's job performance by different HR roles.*

**Keywords:** IT competence, HR technology, HR roles, Job performance

**Received:** 12 September 2011, Revised 9 November 2011, Accepted 14 November 2011

© 2012 DLINE. All rights reserved

## 1. Introduction

In 2009, as the CedarCrestone Human Capital Management (HCM) Survey showed that the best HR practice organizations continuously explore new technologies and apply when warranted [6]. According to other sources, the HR software market has been among the fastest-growing corners of the business software world, and the spending on HR Technology has been holding steady in though economy [33, 36].

Increasingly, IT reshaped the core competencies in HR and the effective use of IT has become one of the HR competency domains and an increase in the number of people with advanced technological backgrounds with the HR function [3]. HR professionals will need not only technical training in new systems use, but also the conceptual knowledge to select, manage, and evolve with new technology [14].

Additionally, when bring IT into HR increasingly calls for an integration of diverse expertise, interdisciplinary comprehension, and modernization of the HR profession [25]. Lack of IT competence has clearly impacted the adaptation and implementation of the IT supported application [23], and therefore, the successful IT application and user's IT competence will affect the outcome of the IT investments [13], and have impact on the HR roles [10].

However, in the area of HR and IT, rigorous empirical studies are uncommon and few studies have addressed the associations between IT, HR, and performance [10]. Although IT is often considered a driver of change within HR [3], little research explore

what kinds of HR role should possess or have more IT competence.

In addressing the issue of IT competence, HR roles, and performance at individual level, both technology-to-performance chain (TPC) model and the HR five-roles model are important theoretical bases in IT/HR field [10, 35].

In that, this paper seeks to address this gap in the two models with IT/HR literature and provide evidences of an empirical investigation of whether or not the IT competence and performance of HR professional are linked, and further investigate if HR role moderates the association between IT competence and performance.

## **2. Background and Hypothesis**

### **2.1 Technology-to-Performance Chain**

The technology-to-performance chain (TPC) proposed by Goodhue and Thompson in their 1995 paper published in MIS Quarterly. The TPC is a proven model of the way in which technologies lead to performance impacts at the individual level and technologies must be utilized and fit the task they support to have a performance impact [28].

It is clear that maximizing IT potential presumes not only that the technology be adopted and used, but that it be used well. Competence with IT is especially important because of its effect on performance of IT usage [20]. The competence is defined as a set of knowledge, skills, or abilities required by individuals in order for them to be competent or effective in their workplace performance [11].

### **2.2 IT Competence**

In the context of IT usage in HR functions, HR professionals are generally act as end users, whereas the end-users' computing competence influences how well they can apply IT knowledge, applications, and information systems to their tasks in an organizational computing environment [39]. Ngai & Wat (2006) found that lacking of IT competencies is a major barrier to embrace Human resource information system [22].

Thus, this study adopted the end-user computing competency developed by Yoon (2009) to measure HR's IT competence other than the IT expertise for IT professional. The end-user computing competency is composed of four major components such as the computing mindset, computing knowledge, computing application, and computing potential [39].

The computing mindset indicates concepts and attitudes, acknowledgement, understanding, and sense of values related to a computing department that can affect end-user computing competency. Computing knowledge means basic knowledge about computing, knowledge of solutions and systems, and knowledge of computing security. Computing application refers to abilities to use computing basics, to apply computing solutions and computing systems to given tasks, to manage business information, and to establish security systems. Computing potential recognizes relevant degrees and certificates, completion of education and training, and accomplishment of knowledge production related to the business of computing or MIS departments as a potential progress factor for improving end-user computing competency.

Since the IT competence is an antecedent to user's performance [20], the hypotheses are proposed as follow:

H1a: Computing Mindset is positively associated with the performance of HR professional.

H1b: Computing Knowledge is positively associated with the performance of HR professional.

H1c: Computing Application is positively associated with the performance of HR professional.

H1d: Computing potential is positively associated with the performance of HR professional.

Corresponding with the TPC model, performance impacts will occur when the technology meets the users' needs and provides features that support the fit of the requirements of the task [9]. Task-Technology fit (TTF) is the degree to which a technology assists an individual in performing his or her portfolio of tasks. TTF is a significant predictor of user's intention to use new technology, whereas the technology will be accepted by individuals only if the functions of the technology correspondents with the tasks to be performed [38]. Therefore, the TTF model is most theoretically consistent with the idea of user competence [20], and seeks to predict performance [5].

Implementing IT can have an operational, relational, or transformational impact on the HR function, depending on the expectation of the primary HR role in organization [25]. If the IT implementation is not compatible with the roles of HR professionals, there may be a diminished influence on their jobs [8].

Accordingly, the question arising from such an argument is: What kinks of the different roles for HR professionals?

The HR roles' cluster of this research is linked to the Five-Roles Model proposed by HR gurus-Ulrich & Brockbank (2005) in their book of "The HR value proposition" [34]. The five roles model was synthesized and revised based on Ulrich's famous four roles model from mid-1990s to mid-2000s for HR professionals.

In summary, HR professionals are employee advocates, charged with making sure the employer-employee relationship in one of reciprocal value. Besides advocating for employees today, they develop the future workforce and help employees unlearn old skills and master new one as human capital developers. They are also functional experts, designing and delivering HR practices that ensure individual ability and create organization capability. As strategic partner, they focus on business literate and savvy to help line managers at all levels to reach their goals. And to tie it all together, they must be genuine leader-credible both within their HR functions and to those outside [34].

However, different HR roles have different attitude toward perceived of usefulness and acceptance of IT [35], and the required IT competence is significantly related to HR roles [19]. To the point, the HR roles may moderate the association between IT competence (computing mindset, computing knowledge, computing application, and computing potential) and the job performance for HR professional. Hence, the following is proposed:

H2: IT competence has different performance impact on the different roles of HR professional.

### **3. Methods**

#### **3.1 Participants and Procedures**

About anecdotal research found that organization factors, such as computing support, user training, management support, and infrastructures, significantly affect IT usage of user [17, 24]. Thus, we choice a sponsor group company which directly holding and managing 8 subsidiaries with the same IT and HR system and condition to participate this study for controlling the organization factors.

The participating subsidiaries represent a diversified sample that covers organizations of varying sizes and sectors and, in total, represent more than twenty-five thousand employees located in Taiwan. The corresponding HR Division is centralized with 123 HR professionals and provides HR services to the 8 companies and employees, while it's HR function and positions that cover the five HR roles in accordance with the purpose of this study.

The survey was e-mailed to those 122 respondents' (excluded the Chief HR Officer, CHRO) immediate supervisors and included request them to complete the web-based questionnaire for understanding the IT competence possessed by their subordinates, and we obtain their actual performance date, HR roles, and required personal profiles from their Human Resource Information System (HRIS) to avoid common method bias.

#### **3.2 Measures**

The instrument in the present study has been developed from previous studies, as using the well-established and accepted scales can provide high convergent and discriminate validity. A Likert scale was used on the questionnaire with the following ratings: 1– strongly disagree, 2 – disagree, 3 – moderately agree, 4 – agree and 5 – strongly agree. The respondent was asked how well his/her subordinates performed the IT competence listed on the web-based questionnaire.

**3.2.1 IT competence :** It was measured using 4 dimensions with 14 items adopted from Yoon (2009) asked the respondents to indicate the level of end user computing competence for their subordinates [39].

**3.2.2 HR roles :** HR professionals fulfill multiple and not single roles, and no one plays all HR roles to the same degree[34]. Thus, the variable was used nominal scale(1 = not involved; 2 = involved) to determine if the HR professional is involved in the HR five roles according to the primary duties demonstrated on the job description. The results were all confirmed with theCHRO.

**3.2.3 Job Performance:** Staples & Seddon (2004) suggested research using more objective measures of individual performance would enhance the internal validity of TPC model [28]. In this study, we acquired the respondent's performance measures from objective record in their HRIS after got approval by the CHRO and he was told the individual performance record would be anonymous. Their performance was appraised the extent to which predetermined work objectives have been met by his/her manager per annum, and the last performance record was used in this study. However, different manager may have different evaluation standard, the final performance rating shall be determined by the performance committee conduct by the CHRO for assuring the internal rating consistency. The performance rating is scaled as following: A(Exceptional performer), B(Above Target Performer), C(On Target Performer), D(Below Target Performer), E(Unsatisfactory Performer).

**3.2.4 Control variable:** Previous research has shown length of service in a company, age, and gender to have an effect on the attitude towards IT systems. These variables may affect the attitude toward e-HRM as well [35], and therefore affect the performance in the context of IT utilization in HR function. In addition, there are several interesting findings that job level (ex: manager vs. non-manager) was strongly correlated with performance rating [15]. All above-mentioned variables are taken into account in this study as control variables.

### 3.3 Research Model

The study adopted multiple hierarchical regression on micro-level to ascertain whether or not the IT competence adding the control variables have a significant influence on the job performance for HR professional, and thereafter tested the moderating effect of HR roles in the relationship between IT competence and job performance. The research model is presented as Figure 1.

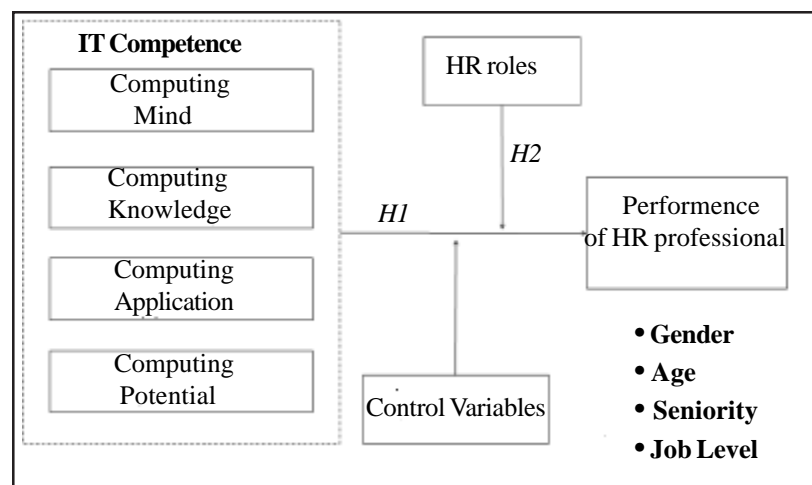


Figure 1. Research Model

## 4. Results

### 4.1 Descriptive Statistics

Table 1 shows a profile of the survey sample from the HR professionals of eight business sectors, and the descriptive statistics of all variables included in this study. A total of 122 usable data were received from those HR managers with 100% response rate.

### 4.2 Validity and Reliability

Table 2 provides scale items, and reliabilities of the constructs of IT competence utilized in this study. The collected data was investigated for validity of the construct by confirmatory factor analysis. Individual item loadings for four rotated factors were all above .60 explaining 87.78% of the variation in that construct. The values of Cronbach's alpha for internal consistency with the fourteen items were all greater than .90.

### 4.3 Hierarchical regression analysis

As seen in Table 3, a series of hierarchical regression analyses were performed to test whether IT competence has positive influences on job performance. In step 1, four control variables were entered into the regression. Overall, the model explained 16.5% of the variance in job performance ( $p < .01$ ). Job level was significantly related to job performance ( $\beta = .36, p < .01$ ). The

remaining three control variables, gender, age, and seniority, were not significantly related to job performance ( $\beta = .04, .17$ , and  $-.06$  respectively,  $p > .05$ ).

In step 2, the four independent variables, computing mindset, computing knowledge, computing application, and computing potential, were added to the regression. As shown in Table 3, the  $R^2$  was increased to 67.2%. The four variables explained a significant amount of variability beyond that of the control variables ( $\beta R^2 = .51, p < .01$ ). The standardized regression weight was significant for computing mindset ( $\beta = .40, p < .01$ ), computing application ( $\beta = .29, p < .01$ ), computing knowledge ( $\beta = .25, p < .01$ ), but not for computing potential ( $\beta = -.10, p > .05$ ). Therefore, H1a, H1b, and H1c were supported, while H1d was not.

Sectors			Job Level		
	Number	Percentage		Number	Percentage
Financial Holding	3	2.5 %	Manager	22	18.0 %
Banking	56	45.9 %	Non-manager	100	82.0 %
Security	17	13.9 %	Performance Rating		
Property & Casualty	11	9.0 %		Number	Percentage
Life Insurance	24	19.7 %	A (Exceptional Performer)	6	4.9 %
Fund Management	2	1.6 %	B (Above Target Performer)	30	24.6 %
Direct Marketing	5	4.1 %	C (On Target Performer)	33	27.0 %
Asset Management	4	3.3 %	D (Below Target Performer)	35	28.7 %
Gender			E (Unsatisfactory Performer)	18	14.8 %
	Number	Percentage	HR Role Dedication (person time)		
Male	29	23.8 %		Number	Percentage
Female	93	76.2 %	Employee advocate (EA)	44	36.1 %
Education			Human Capital developer (HC)	64	52.5 %
	Number	Percentage	Functional expert (FE)	77	63.1 %
Master	50	41.0 %	Strategic partner (SP)	20	16.4 %
Bachelor	58	47.5 %	Leader (LD)	24	19.7 %
College	10	8.2 %	IT Competence		
High School	4	3.3 %		Mean	SD
Age			Computing Mindset (CM)	3.14	0.74
	Mean	SD	Computing Knowledge (CK)	2.86	0.69
Seniority in the Group	36.32	7.00	Computing Application (CU)	2.82	0.76
	7.29	6.62	Computing Potential (CP)	1.30	0.83

Table 1. Descriptive Statistics

Factors	Measure items	factors Loading				Cumal variance $\alpha$	Cronbach's $\alpha$
		1	2	3	4		
Computing Knowledge (CK)	CK1: Knowledge related to hardware, networks, and databases CK3: Knowledge related to e-business(B2B, B2C, and B2E) CK4: Knowledge related to security of computing systems CK2: Solution knowledge related to ERB, SCM, KMS, and CRM	.806 .805 .786 .748				22.82%	.916
Computing Potential ability (CP)	CP1: Master's or Ph.D. degree related to computing fields CP3: Number of papersand articles published in journals CP2: Completeion of domestic & owerseas education and training related to computing		.921 .910 .871			45.35%	.973
Computing mindset (CM)	CM1: Understanding & acknowledgement for computing departments CM3: Ethic consciousness and morality in a computing environment CM2: Understanding of progress trends of domestic & overseas computing departments			.883 .854 .850		67.07%	.913
Computing utilization ability (CU)	CU4:Ability established and managing computer security CU2: Ability using ERP, SCM, CRM,and KMS etc.,solutions CU3: Ability applying computing systems to e- business(B2E,B2C) CU1: Ability using spreadsheet, presentation,and word processing				.829 .818 .813 .661	87.78%	.948

Table 2. Confirmatory Factor analysis and Reliability testing

Independent Variable	Job Performance		
	$\beta$	R <sup>2</sup>	$\beta$ R <sup>2</sup>
Step 1			
Gender	.043	.165**	--
Age	.167		
Seniority	-.061		
Job level	.359**		
Step 2			
Computing Mindset(B)	.404**	.672**	.507**
Computing Knowledge(B)	.249**		
Computing Application(B)	.293**		
Computing Potential	-.102		

*Note:*  $\beta$  represents the standardized regression coefficients for the full model, including control variables and three dimensions of corporate image. \*  $p < .05$ , \*\*  $p < .01$

Table 3. Hierarchical regression analysis for all HR roles

Further, the hierarchical regression was performed by different HR roles and the results were shown on table 4. It was found that IT competence has different impact on the job performance for different HR roles, and the net explanatory power was the greatest for Human Capital Developer followed by Strategic Partner, HR Leader, Employee Advocate, and Functional Expert sequentially.

Specifically, computing mindset was positively associated with the job performance for Employee Advocate, Human Capital Developer, Strategic Partner, and HR Leader, but not for Functional Expert. Computing knowledge was positively associated with the job performance for Employee Advocate, Human Capital Developer, Strategic Partner, but not for Function Expert and HR Leader. Computing application was positively associated with Functional Expert only. Computing potential was negatively associated with Employee Advocate and Functional Expert. Thus, H2 was supported.

	Employee Advocate	Human Capital Developer	Functional Expert	Strategic Partner	HR Leader
Computing Mindset( $\beta$ )	.575*	.396**	.123	.697*	.525*
Computing Knowledge( $\beta$ )	.525**	.350**	.226	.722*	.098
Computing Application( $\beta$ )	-.058	.081	.529**	-.636*	.538
Computing Potential( $\beta$ )	-.305*	.138	-.228*	-.233	.290
$\Delta R^2$	.490**	.565**	.444**	.520**	.508**

*Note :*  $\beta$  represents standardized regression coefficients for the full model, including variables and three dimensions of corporate image. \*  $p < .05$ , \*\*  $p < .01$ .

Table 4. Hierarchical regression analysis for different HR roles

## 5. Discussion

Overall, our results demonstrated that the IT competence (i.e. computing mindset, computing knowledge, computing application, and computing potential) affects job performance for HR professional, whereas it has different performance impact on the different roles of HR professional. In general, the all hypotheses were confirmed, but some of the results require qualification and discussion.



The results indicate that IT competence is one of HR competency domains in consistent with the survey data of the Human Resource Competency Study (HRCS) in 2003. HR professionals need to be able to leverage technology for HR practices and take advantage of IT by automating HR processes and becoming more effective in communicating with its internal/external customers. [19].

Our results further show that computing mindset is the most critical IT competency factor for HR professionals except Functional Experts who focus more on computing application than the other roles. Functional Experts are generally involved in creating solution to routine HR problems through a company intranet or secure internet site. In most firms, the primary application of HR technology to date is in transactional HR work which is primarily delivered From Functional Experts. Even for the higher level Functional Expert, conducting research and turning into practice, they demand specialization in HR field and are not expected to be a generalist [34].

Thus, Functional Expert may just required to apply IT as a tool to search and use information on the Internet, to use presentation and word processing, to make full use of Human Resource Information System and Knowledge Management System, to apply these solutions to a B2E (Business to Employee), and to have the ability to establish and manage computing security for protecting employee data rather than to capture the computing mindset, knowledge, and potential.

The consequences of IT usage of HR (termed electronic human resource management, e-HRM) include operation, relation, and transformation (Strohmeier, 2007). Operation refers to bring faster-processes, cost reduction, and a release from administrative burdens [12, 22, 25], therefore, leading positive assessments of the HR functional (especially for Functional Expert) effectiveness [10].

Relation refers to the new and extended possibilities of interactions between people, which lead to accumulate the social capital-trust, mutual understanding, and shared valued and behaviors that bind people together and make cooperative action possible [18, 26], such as virtual communities or e-learning [17]. For example, Employee Advocate and Human Capital Developer should have computing mindset and knowledge to cooperate with IT well and search emerging technology to establish an effective employee communication and/or social networking (ex: web 2.0) and/or e-learning solutions.

Transformation concerns the HR role playing in organization performance and strategy support as a strategic partner [32]. Strategic Partner should have computing mindset and knowledge to know how the value of enterprise system and/or business intelligent on strategy implementations and the development of organizational structure and reward systems [37], while the mindset and knowledge enable Strategic Partner to collect data and transform it into strategically valuable information [3] for acting as a business literate and savvy [34].

In contrast to Functional Expert, the job performance of Employee Advocate, Human Capital Developer, and Strategic Partner relies on relation and transformation more than operation. Application itself may be required, but it may not be the critical performance indicator compared with the computing mindset and knowledge for those HR roles.

HR Leader as well as business manager should not be expected to know everything about IT. However, HR Leader should have computing mindset to understand and acknowledge IT, and to know about the resources to access and leverage IT knowledge [2], which in turn to lead HR function and integrate other function for business success. When a HR Leader has hold positive computing mindset, the computing knowledge, application, or potential may irrelevant to his/her job performance.

An interesting finding on this study was the computing potential has negative impact on the job performance for Functional Experts and Employee Advocates. Previous study found that internal focus of HR role as administrative expert or specialist is linked to competencies related to ‘customer’ relations, and employee advocate is expected to listen and respond to individual needs [24, 34], which are all required face-to-face interaction with employees and line managers.

For Employee Advocate, Voermens & van Veldhoven (2007) found that when workers or managers prefer HR in the employee champion role have more negative attitude towards e-HRM [35]. For Functional Expert, e-HRM often substitute electronic communications for face-to-face and reduce the reliance employees have on HR personnel [25], while decrease the interpersonal trust level [29].

Regarding to the negative performance effect caused from Computing Potential, it could be explained by its definition which

recognizes the IT academic background related relevant degrees and certificates, completion of education and training, and paper publication [39]. When people come from this background and dedicate in the role of HR functional expert or employee advocate, they might enthusiastic for using this potential to substitute face-to-face interaction for enhancing efficiency and cost saving. Consequently, the good intention yielded a number of dysfunctional consequences for his/her performance [30].

In vice versa, when employees prefer a strategic role for HR, they would be more positive towards an e-HRM implementation [35]. Human Capital Developer focus on future talent pipeline aligned with business strategy; Strategic Partner has to align HR activities with business strategy and support organization change; HR Leader should integrate and coordinate HR functions with other resources to assist in strategy development and achievement [34]. When those three strategic HR roles are equipped more IT competence (particularly for computing mindset and knowledge), their job performance might be enhanced in consistent with the study made by Hanes III & Lafleur (2008) "IT allows the HR function to further help the organization accomplish business goals and define business strategies" [10].

Above argument could be used to explain why IT competence has stronger performance predictive power for Human Capital Developer, Strategic Partner, and HR Leader than Employee Advocate and Functional Expert.

## **6. Conclusion**

Ulrich & Brockbank (2005) argue that HR professionals must learn to leverage IT to provide faster services to their internal clients on a global scale, reduce the costs per transaction, provide centralized services and information that will make it easier to manage and leverage the total workforce, and spend more time focusing on making strategic contributions [34].

Our study supported the above argument and found that IT competence is a significant predictor of job performance for HR professional. The finding indicated that the performance leverage effect of IT competence for Human Capital Developer, Strategic Partner, and HR Leader is greater than Employee Advocate and Functional Expert in individual level.

The most essential factors for Employee Advocate, Human Capital Developer, and Strategic Partner were computing mindset and computing knowledge. The only critical factor of IT competence was the computing application and computing mindset for Functional Expert and HR Leader respectively.

This research has important implications for management. If HR professionals develop and improve their IT competence, they can more efficiently perform their given tasks and effectively increase their task performance in a business environment heavily relying on e-HRM. HR managers should proactively move to reinforce weak areas of IT competence by different HR role. Training and encouraging hands-on experience with IT are a first step in developing and strengthening IT competence in areas lacking this valuable resource [1]. A more immediate approach to developing additional IT competence in the HR function is to view it as a necessary skill-set in the hiring process.

While the typical hiring process in non-IT areas focuses almost entirely on their functional competencies [7], this study highlights the value of evaluating a candidate's IT competence with different factor for different HR role when making hiring decisions.

## **7. Limitations and Future Research**

Like most empirical research, there are some limitations of this study that should be pointed out. First, one of the limitations of this study is the small sample that was derived from the most-profitable and second-biggest financial holding group with eight financial service companies in Taiwan. The conclusion may not be generalizable beyond this particular population. A future study might collect diversify data to retest this research model.

Second, the halo effect might occur when those HR managers evaluated the IT competence of their subordinates by the perception of one trait. Event though, we conducted a rater error training to avoid this common error before submitting the survey. Future research might also use a more explicit measure of IT competence residing within HR department.

Finally, while the measurement of HR roles from both Job description and confirmed with the CHRO, the construct is captured through Subjective Expert. Future research may use a multidimensional approach to capturing HR roles in individual level.



## References

- [1] Bassellier G, Benbasat I, Reich, B. H. (2003). The influence of business managers' IT competence on championing IT. *Information Systems Research*, 14 (4) 317-336.
- [2] Bassellier, G., Reich, B. H., Benbasat, I. (2001). Information Technology Competencies of Business Managers: a definition and research model, *Journal of Management Information System*, 17 (4) 159-182.
- [3] Bell, B. S., Lee, S. W., Yeung, S. K. (2006). The impact of e-HR on professional competencies in HRM: implications for the development of HR professionals, *Human Resource Management*, 45 (3) 295-308.
- [4] Bondarouk, T. V., Ruël, H. J. M. (2009). Electronic Human Resource Management: challenges in the digital era. *The International Journal of Human Resource Management*, 20 (3) 505-514
- [5] Cane, S., McCarthy, R. (2009). Analyzing the factors that affect information systems use: a task-technology fit meta-analysis. *Journal of Computer Information Systems*, Fall, p. 108-123.
- [6] CedarCrestone, HR SYSTEMS SURVEY: HR Technologies, Service Delivery Approaches, and Metrics Approaches Survey. In: 11th annual edn (2009)
- [7] Davis, J. M., Kettinger, W. J., Kunev, D. G. (2009). When users are IT experts too: the effects of joint IT competence and partnership on satisfaction with enterprise-level systems implementation, *European Journal of Information Systems*, 18(1) 26-37.
- [8] Gardner, S. D., Lepak, D., Bartol, K. M. (2003). Virtual HR: the impact of information technology on the human resource professionals. *Journal of Vocational Behaviour*, 63, 159-79.
- [9] Goodhue, D. L., Thompson, R. L. (1995). Task-Technology Fit and Individual Performance. *MIS Quarterly*, 19 (2) 213-236.
- [10] Haines III, V. Y., Lafleur, G. (2008). Information technology usage and human resource roles and effectiveness, . *Human Resource Management*, 47 (3) 525-540
- [11] Han, J., Chou, P., Chao, M., Wright, P. M. (2006). The HR competencies - HR effectiveness link: A study in Taiwanese high tech companies. *Human Resource Management*, 45 (3) 391-406
- [12] Hawking, P., Stein, A., Foster, S. (2004). e-HR and employee self-service: A case study of a Victorian public sector organization. *Journal of Issues in Informing Science and Information Technology*, 1, 1019-1026.
- [13] Huang, M., Wong, C. S. (2010). First-line and Middle Manager Competence, Usage Intention and IT Application Maturity. *International Journal of Innovation, Management and Technology*, 1 (4) 349-353.
- [14] Jones, W., Hoell, R. (2005). Human resource information system courses: an examination of instructional methods. *Journal of Information Systems Education*, 16 (3) 321-328.
- [15] Kahya, E. (2007). The Effects of Job Characteristics and Working Conditions on Job Performance. *International Journal of Industrial Ergonomics*, 37 (6) 515-523.
- [16] Lee, Y., Kozar, K.A., Larsen, K. R. T. (2003). The technology acceptance model: Past, present and future. *Communications of the Association for Information Systems*, 12 (50) 752-780.
- [17] Lee, C. S., Lee, C. H. (2009). Effects of HRM practices on IT usage. *Journal of Computer Information System*, 50 (2) 83-90
- [18] Lengnick-Hall, M.L., Moritz, S. (2003). The Impact of e-HR on the Human Resource Management Function, *Journal of Labor Research*, 24 (3) 365-379.
- [19] Long, C. S., Wan-Ismail, W. K. (2008). Human Resource Competencies: A Study of the HR Professionals in Manufacturing Firms in Malaysia. *International Management Review*, 4 (2) 65-76.
- [20] Marcolin, B., Compeau, D., Munro, M., Huff, S. (2000). Assessing user competence: Conceptualization and measurement. *Information Systems Research*, 11 (1) 37-60.
- [21] Marler, J. H. (2009). Making human resources strategic by going to the Net: reality or myth? *The International Journal of Human Resource Management*, 20 (3) 515-527.
- [22] Ngai, E. W. T., Wat, F. K. T. (2006). Human resource information systems: a review and empirical analysis. *Personnel Review*, 35(3), 297-314.

- [23] Olivas-Lujan, R., Miguel, Ramirez, Jacobo, Zapata-Cantu, Laura. (2007). e-HRM in Mexico: adapting innovations for global competitiveness. *International Journal of Manpower*, 28(5) 418-434.
- [24] Panayotopoulou, L., Papalexandris, N. (2004). Examining the link between human resource management orientation and firm performance. *Personnel Review*, 33, 5/6, 499.
- [25] Ruël, H. J. M., Bondarouk, T., Looise, J. C. (2004). E-HRM: Innovation or irritation. An explorative empirical study in five large companies on web-based HRM. *Management Review*, 15(3) 364-381.
- [26] Ruta, C. D. (2009). HR portal alignment for the creation and development of intellectual capital. *The International Journal of Human Resource Management*, 20 (3) 562-577.
- [27] Ruta C. D. (2005). The application of change management theory to HR portal implementation in subsidiaries of multinational corporations. *Human Resource Management*, 44 (1) 35-53.
- [28] Staples, D. S., Seddon, P. (2004). Testing the technology-to-performance chain model. *Journal of Organizational and End User Computing*, 16(4), 17-36.
- [29] Stone, D. L., Lukaszewski, K.(2009). An expanded model of the factors affecting the acceptance and effectiveness of electronic human resource management systems. *Human Resource Management Review*, 19, 134-143.
- [30] Stone, D. L., Stone-Romero, E. F., & Lukaszewski, K. (2006). Factors affecting the acceptance and effectiveness of electronic human resource systems. *Human Resource Management Review*, 16, 229-244.
- [31] Strohmeier, S. (2009). Concepts of e-HRM consequences: a categorisation, review and suggestion. *The International Journal of Human Resource Management*, 20 (3) 528-543
- [32] Strohmeier, S. (2007). Research in e-HRM: Review and implications. *Human Resource Management Review*, 17, p. 19-37.
- [33] Towers Watson. (2009). Towers Perrin's annual survey on HR service delivery trends and practices: No Recession in HR Tech Spending.
- [34] Ulrich, D., Brockbank, W. (2005). The HR Value Proposition, Cambridge, MA: Harvard Business School Press.
- [35] Voermans, M., van Veldhoven, M. (2007). Attitude towards E-HRM: an empirical study at Philips. *Personnel Review*, 36 (5-6) 887-902.
- [36] Workforce Management: Study: Spending on HR Technology to Hold Steady. International Association for Human Resources Information Management Survey (IHRIM). (2008).
- [37] Wooldridge, B., & Floyd, S. W. (1990). The strategy process, middle management involvement, and organizational performance. *Strategic Management Journal*, 11, 231-241
- [38] Yen, D. C., Wu, C. S., Cheng, F. F., Huang, Y. W. (2010). Determinants of users' intention to adopt wireless technology: An empirical study by integrating TTF with TAM. *Computers in Human Behavior*, 26 (5) 908-915.
- [39] Yoon, C. Y. (2009)The effect factors of end-user task performance in business environment: Focusing on computing competency. *Computers in Human Behavior*, 25 (6) 1207-1212.