First Australia and New Zealand Conference on Advanced Research (ANZCAR-Melbourne, 2017)
ISBN: 978-0-9953980-4-7
www.apiar.org.au

HUMAN RESOURCE INFORMATION SYSTEMS IN KOREAN SMALL-MEDIUM COMPANIES

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Abstract

The Human Resource function of each company deals with a variety of sensitive employment data and information. In this context, identifying significant risks and implementing effective system controls are essential to safeguard the integrity of this information. An increased number of companies is utilising Human Resource Management Information System (HRMIS) or Human Resource Information System (HRIS) or Human Resource Management (HRM) in order to manage their work force and also to meet their employer's obligations, to optimize their management and improve their efficiency. The purpose of this study is to present a framework and an empirical analysis for the survey data from 482 Korean small and medium sized companies to understand relationship between HRIS, HR activities and HRM. The results of the research model using Structural Equation Model (SEM) show that there are significant and very strong positive relationships between HRIS and HRM, there are significant, positive relationships between HRIS and HR activities, such as recruitment, relocation; promotion and evaluation in lesser extent. The results suggest that information technology affects HR management and support HR activities.

Keywords: Human Resource Information System, HR activities, HR Management, Structural Equation Model.

1. Introduction

The Human Resource function of each company deals with a variety of sensitive employment data and information. In this context, identifying significant risks and implementing effective system controls are essential to safeguard the integrity of this information. Thus, those areas, such as managing HR and payroll data; legislation and compliance; risks and controls, should be considered. Increased number of companies are utilising Human Resource Management Information System (HRMIS) or Human Resource Information System (HRIS) or Human Resource Management (HRM) in order to manage their work force, and to meet their employer obligations (Australian National Audit Office, 2013), to optimize their management and improve their efficiency (Mukherjee et al. 2014). The HRIS is important to strategise decision-making, as well as in supporting day-to-day operational planning and administration. HRIS can be defined as integrated systems used to gather, store and analyze information regarding an organization's human resources. Using HRIS technology can help HR automate and simplify tasks, reduce administration and record keeping and provide management with HRrelated information when required (Satav, 2016). Key areas supported by HR departments involve workforce planning and staffing, managing direct and indirect compensation schemes, employee relations, performance management, training and legal compliance (Simon, 2013). In this paper, the author tests the association between HR departments (HRDP), HRMIS, HR activities, and HR Management (HRM) of Korean small and medium companies, using data from the Human Capital Corporate Panel survey, which is officially approved by Korea National Statistical Office. The surveys were conducted every two years between 2005 and 2013. Figure 1 shows that development stages of HR information systems among Korean SMEs for a scale of

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zero to three from 2005 to 2013. It was almost zero in 2005, and gradually reached two by year 2009. Operating areas of HR Information System were asked for the 2005 and the 2007 surveys. Figure 2 implies that companies utilized HR information systems in different operational areas for those two years. This paper is structured as follows: In the next section the author gives a brief overview on the Human Resource Information Technology. Subsequently, data and methods which are used to test the hypotheses are detailed. In the fourth section, the results are discussed, along withtheir implications and limitations.

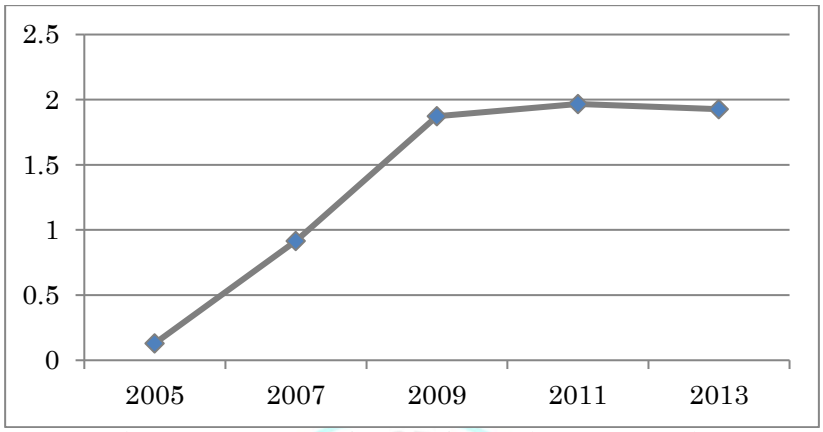

Figure 1: Development Stages of HR Information Systems in Korean SME

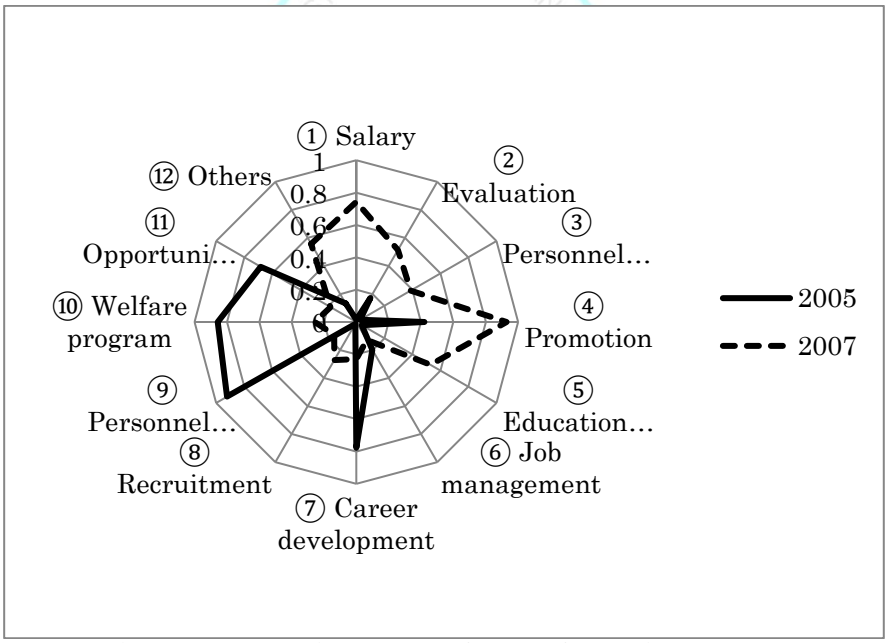

Figure 2: Operating Areas of HR Information System

2. Literature Reviews

Information technology (IT) has been developed to support business decision making in order to increase the quality of business decisions (Turban et al. 2007; O'Brien & Marakes, 2008). The role of information technology (IT) has gained increasing interest in the area of strategy formulation and implementation, and Human Resource (HR) function, which supports strategic goals, also leverages IT. Mamoudou(2014) also suggests that HR is one of the key tasks of a

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strategic management, and should play an important role in all strategic decisions.
Increased number of organizations views HR as a source of competitive advantage (Kavanagh, et al., 2014). The HRM function was one of the last management functions for automation, because of the complexity and data intensiveness of its nature (Bussler & Davis, 2001). An empirical study in the retail industry shows that ITs alone have not produced sustainable performance advantages, but that some firms have gained advantages by using ITs to leverage human and business resources (Powell and Dent-Micallef, 1997). Currently, HR technology is increasingly being used by even small, medium, and large employers to meet the needs of its stakeholders (Bulmash, 2006).

HR processes and practices have been affected by IT adaption. According to Ghorbanizade (2013), information technology leads to human resources development in the following aspects:

1) Rebuilds the old skills;
2) Completes the previously vacant capacities;
3) Creates new skills; and
4) Creates the link between workers' skills.

After mentioning factors influencing HRM, such as A) Rules and regulations, B) Labor market, C) The atmosphere and culture of the organization and the community, D) Important goals, E) Shareholders, F) Compete, G) Customers, H) Information Technology, Piry *et al.,* (2013) suggests one of the most important factors is information technology, in order to better fulfill the duties of a human resources manager. Anyadike (2014) lists the following areas; 1) recruting, training, 3) data storage and retrieval, 4) performance management, as where IT has impacted on Human resources management. In the era of Big Data, HR professionals are provided with an extraordinarily large amount of insight by those Big Data, which enable them to make decisions backed by concrete information and more efficient processes (Biro, 2017).

3. Research Model and Hypotheses

In this paper, the author constructs the research model (see figure 3) to test relationships between HRIS, HRDP, HRM and HR activities to see how HRIS influences over HRDP, HRM, and HR activities. Then, the author formed four hypotheses based on this framework which are as follows.

H1: There is a significant, positive relationship between HRIS and HRDP.
H2: There is a significant, positive relationship between HRIS and HRM.
H3: There is a significant, positive relationship between HRIS and HR Activities A.
H4: There is a significant, positive relationship between HRIS and HR Activities B.

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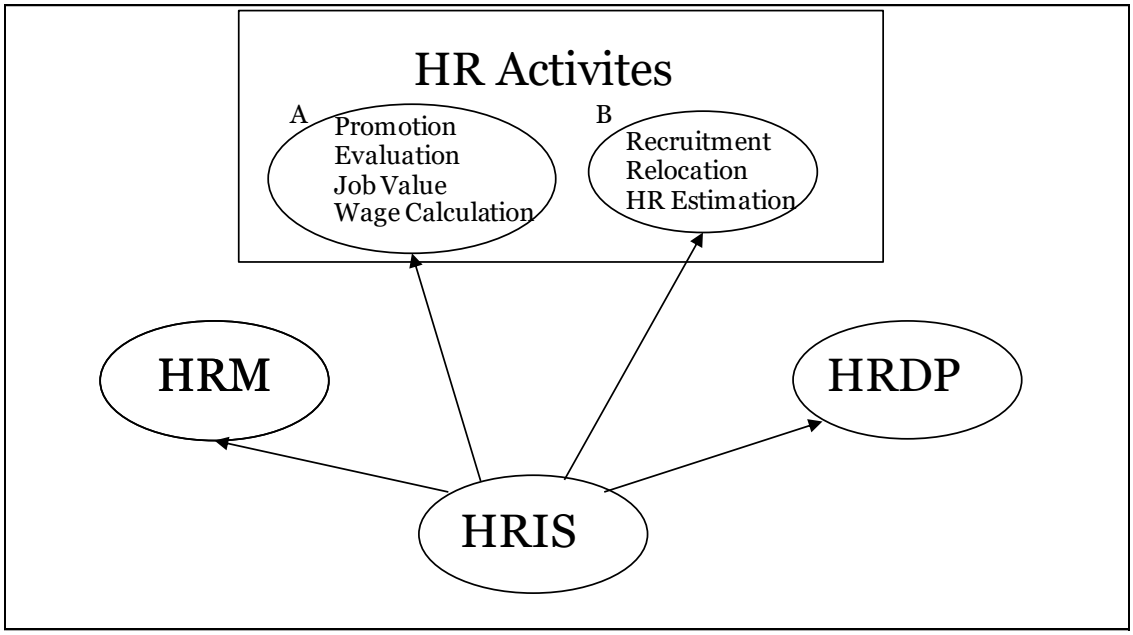

Figure 3: The Resaerch Model

4. Data

Human Capital Corporate Panel Survey (HCCP) data collected by the Korean Research Institute for Vocational Education and Training were utilized (KRIVET, 2013). The Human Capital Corporate Panel Survey is a long-term study of the HR practices, employee attitudes, and organisational performance for Korean firms, officially approved by Korea National Statistical Office. The HCCP has biennially obtained data every two years since 2005. This research is based on HCCP data collected in 2013, because variables related to HRIS and HRM are included in this year's survey. The survey population includes corporations employing more than 100 workers and listed in "KIS Corporate Data 2005," published by the Korea Information Service, or those which employs more than 300 workers and unlisted. Since Korean legistlation (SMBA, 2016) defines SME as a firm with less than 300 full-time employees or equivalent for the manufacturing sector, or a firm with capital of less than 8 billion won, companies in this data can be considarded as SMEs. There are 482 valid responses. Most of the questionnaires used a five point scale rating. Table 2 shows the descriptive statistics. More than half of corporations have employees of less than 300. 74 percent of corporations are in the manufacturing industries. Most of the respondents are male.

A list of variables is shown in table 2. Table 3 contains the Pearson correlation coefficient between all pairs of ten variables with the two-tailed significance of these coefficients. Most of variables correlate fairly well, some of them are statistically significant, and none of the correlation coefficients are particularly large; therefore, multicollinearity is not a problem for these data.

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Table 1: Descriptive Statistics

		Frequency	Percent
Corporate Size	Less than 300	238	49.4
	300 to 999	159	33.0
	1000 ~ 1999	45	9.3
	2000 or more	40	8.3
Industries	Manufacturing	357	74.1
	Financial business	32	6.6
	Non-financial	93	19.3
Gender	Male	474	98.3
	Female	8	1.7

Table 2: A List of Variables

HRDP	C5D01_01	Presence of organization responsible for HR
	C5D01_02	Functional differentiation of HR task
HRIS	C5D01_06	Operational situation of HRIS
	C5D01_06_01	Development stage of HRIS
HR Activities A	C5D01_07_02	HR Estimation
	C5D01_07_03	Recruitment
	C5D01_07_05	Relocation
HR Activities B	C5D01_07_06	Evaluation
	C5D01_07_07	Promotion
	C5D01_07_09	Job Value and Wage Calculation
HRM	C5D01_05_01	Personnel planning and management strategy
	C5D01_05_02	Degrees to reflect a company's mid-long term strategy in HR

Table 3: Correlation Matrix

	C5D01_07_06	C5D01_07_07	C5D01_07_09	C5D01_07_02	C5D01_07_03	C5D01_07_05	C5D01_01	C5D01_02	C5D01_06	C5D01_06_01
C5D01_07_06	1	.492**	.217**	-.038	.148*	-.033	-.062	.057	-.103	.043
C5D01_07_07	.492**	1	.293**	-.078	.253**	.176**	.058	-.092	.062	.096
C5D01_07_09	.217**	.293**	1	.071	.104	.051	.015	-.040	.096	.134*
C5D01_07_02	-.038	-.078	.071	1	.197**	.089	.273**	-.095	.140*	.141*
C5D01_07_03	.148*	.253**	.104	.197**	1	.193**	.170**	-.062	.048	.158*
C5D01_07_05	-.033	.176**	.051	.089	.193**	1	.146*	-.186**	.224**	.098
C5D01_01	-.062	.058	.015	.273**	.170**	.146*	1	.000	.342**	.169**
C5D01_02	.057	-.092	-.040	-.095	-.062	-.186**	.000	1	-.079	-.196**
C5D01_06	-.103	.062	.096	.140*	.048	.224**	.342**	-.079	1	.000
C5D01_06_01	.043	.096	.134*	.141*	.158*	.098	.169**	-.196**	.000	1

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

*. Correlation is significant at the 0.05 level (2-tailed.)

Table 4: Reliability Test

FIT indices	Recommended level	Research Model
CMIN/DF	5.0 (Wheaton et al, 1977)~2.0 (Tabachnick and Fidell, 2007).	1.767
CFI	>0.90 (Bentler, 1990)	0.940
IFI	>0.90 (Bollen, 1989)	0.944
RMSEA	<0.08(Browne and Cudeck,1993)	0.040
AIC	Smaller values suggest a good fitting (Akaike, 1974)	169.297
p-value	>0.05	0.001

5. Results

When SEM is used to verify a theoretical model, a better goodness of fit is required for SEM analysis (Byrne, 2010); the better the fit, the closer the model matrix and the sample matrix. By means of various goodness-of-fit indexes, including the comparative fit index (CFI)(Byrne, 2010), the incremental fit index (IFI) (Byrne, 2010), and the root mean squared error of approximation (RMSEA) (Browne & Cudeck,1993), the estimated matrix can be evaluated against the observed sample covariance matrix to determine whether the hypothesized model is an acceptable representation of the data.

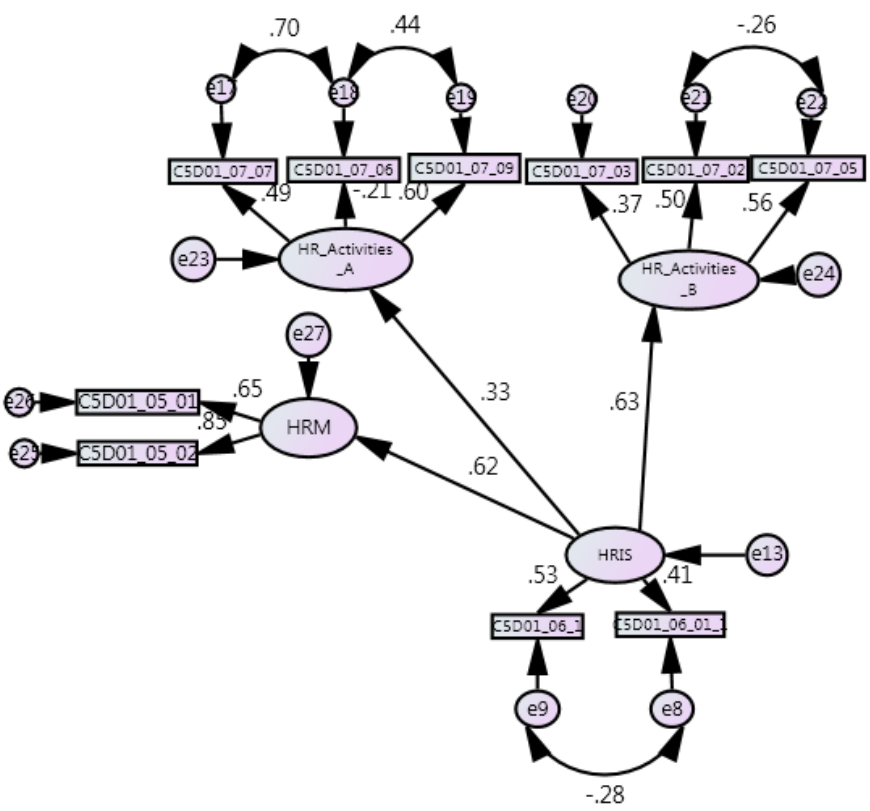

Figure 4: The Research Model

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Table 5: The Path Coefficients of The Research Model

Construct			Std. weight	Unstd. Weight	S.E.	C.R.	P-value
HR Activities A	<---	HRIS	0.23	0.269	0.148	1.822	0.068
HR Activities B	<---	HRIS	0.636	0.505	0.172	2.936	0.003
HRDP	<---	HRIS	-	-1.785	0.43	-4.147	***
HRM	<---	HRIS	0.721	2.494	0.428	5.823	***
C5D01_06_01_1	<---	HRIS	0.342	1			
C5D01_06_1	<---	HRIS	0.461	0.975	0.196	4.963	***
C5D01_02_1	<---	HRDP	-	1			
C5D01_01_1	<---	HRDP	-	-0.754	0.157	-4.799	***
C5D01_07_07	<---	Promotion__Evaluation	0.594	1			
C5D01_07_06	<---	Promotion__Evaluation	-0.382	-0.669	0.79	-0.848	0.396
C5D01_07_09	<---	Promotion__Evaluation	0.495	0.624	0.437	1.431	0.153
C5D01_07_03	<---	Recruitment__Relocation	0.371	1			
C5D01_07_02	<---	Recruitment__Relocation	0.545	1.467	0.499	2.953	0.003
C5D01_07_05	<---	Recruitment__Relocation	0.521	1.396	0.479	2.899	0.004
C5D01_05_02	<---	HRM	0.873	1			
C5D01_05_01	<---	HRM	0.633	0.312	0.033	9.527	***

In general, incremental fit indexes (*i.e.*, CFI, IFI) above 0.90 signify good model fit. RMSEA values lower than 0.08 signify an acceptable model fit, with values lower than 0.05 indicative of good model fit (Browne & Cudeck, 1993). The research model is shown in figure 4; CFI=0.940, IFI=0.944, RMSEA= 0.040 (see table 4). The Path Coefficient for both structural models suggested that the regression coefficient for all constructs show significance. Since all of the indexes satisfy the cut-off values, these results are regarded as acceptable.

The followings are results of hypotheses;

H1: There is a highly statistically significant, positive relationship between HRIS and HRDP.
H2: There is a highly statistically significant, positive relationship between HRIS and HRM.
H3: There is a positive with 10-percent statistical significance between HRIS and HR Activities A.
H4: There is a highly statistically significant, positive relationship between HRIS and HR Activities B.

Table 5 summarizes the results of the tests for the research model.

6. Results

Previous literature stated that one of the most important factors for HR is information technology in order to better fulfill the duties of a human resources manager. This study presents a framework and an empirical analysis for the survey data from 482 Korean small and medium sized companies to understand relationship between HRIS, HR activities, and HRM. The results of the research model using Structural Equation Model (SEM) show that there are significant, very strong positive relationships between HRIS and HRM, there are significant, positive relationships between HRIS and HR activities, such as recruitment, relocation; promotion, and evaluation in lesser extent. The results suggest that information technology affects HR management and support HR activities.

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Acknowledgement

This work was supported in part by Grant-in-Aid for Scientific Research (C) 15K03607.

References

i. Akaike, H., 1974. A New Look at the Statistical Model Identification. *IEE Transactions on Automatic Control,* 19(6), pp. 716-723.

ii. Anyadike, N., 2014. Effective Strategies for the Improvement of Human and Material Resources Management in the Nigerian Local Government System. *International Review of Management and Business Research,* 3(2), pp. 1264-1274.

iii. Australian National Audit Office, 2013. *Human Resource Information Systems,* s.l.: Risks and controls.

iv. Biro, M., 2017. *The Impact of Technology on HR and What's Ahead.*. [Online] Available at: http://www.huffingtonpost.com [Accessed 25 April 2017].

v. Bollen, K., 1990. Overall Fit in Covariance Structure Models. *Two Types of Sample Size Effects,Psychological Bulletin,* 107(2), pp. 256-259.

vi. Browne, M. & Cudeck, R., 1993. Alternative ways of assessing model fit. *Sociological Methods and Research,* Volume 21, p. 230–239.

vii. Bulmash, J., 2006. *Human Resource Management and Technology*. s.l.:Part 1 of Human Resource Management in Perspective.

viii. Bussler, L. & Davis, E., 2001. Information system:The quiet revolution in human resourcE managemenT. *Journal of Computer Information System,* 19(3), pp. 41-50.

ix. Byrne, B., 2010. *Structural equation modeling using AMOS, Basic concepts, applications, and programming*. 2nd ed. New York: Routledge.

x. E.Turban, D.Leidner, E.McLean & Wetherbe, J., 2006. *Information Technology for Management*. 5th ed. s.l.:Wiley & Sons.

xi. Ghorbanizadeh, V., 2013. Meta-analysis of factors affecting adoption of Information Technology in Iran. *Management Research in Iran,* 17(2), pp. 177-196.

xii. Kavanagh, M., Thite, M. & Johnson, R., 2014. *Human Resource Information System*. 3rd ed ed. s.l.:Sage Publication.

xiii. Korea Research Institute for Vocatonal Educatoin and Training (KRIVET), 2013. *Human Capital Corporate Panel Survey (HCCP).,* s.l.: Korea Research Institute for Vocatonal Educatoin and Training (KRIVET).

xiv. MacCallum, R., Browne, M. & Sugawara, H., 1996. Power Analysis and Determination of Sample Size for Covariance Structure Modeling. *Psychological Methods,* 1(2), pp. 130-149.

xv. Mamoudou, S. & Joshi, G., 2014. Impact of Information Technology in Human Resources Management.. *Global Journal of Business Management and Information Technology,* 4(1), pp. 33-41.

xvi. Mohammadi, G. & Hamid, 2006. *Human resource management and organizational performance,* s.l.: an overview of the theoretical literature and derive some applied findings for co-operatives.

xvii. Mukherjee, A., S.Bhattacharyya & Bera, R., 2014. Role of Information Technology in Human Resource Management of SME. *Journal of Management and Research,* 3(1), pp. 1-22.

ISBN: 978-0-9953980-4-7
www.apiar.org.au

xviii. O'Brien, J. & Marakas, G., 2008. *Management Information Systems.* 8th ed. s.l.:The McGraw-Hill Companies.

xix. Piry, A., Hatamikhibari, H., K.Janfeshan & M.Ghahramani, 2013. The Role of Information Technology in Human Resource Management. *Journal of Basic and Applied Scientific Research,* pp. 1034-1038.

xx. Powell, T. & Dent-Micallef, A., 1997. Information Technology as Competitive Advantage:The Role of Human,. Business, and Technology Resources.. *Strategic Management Journal,,* 18(5), pp. 375-405.

xxi. Satav, M., 2016. Human Resources Management and Technology. *Journal of Computer Engineering,* pp. 55-57.

xxii. Simon, J., 2013. *Critical Success Factors for Human Resource Departments.* [Online] Available at: http://smallbusiness.chron.com [Accessed 9 April 2017].

xxiii. Small and Medium Business Administration (Korea)., 2016. *Small and Medium Business Administration (Korea)..* [Online] Available at: eng.smba.go.kr/site/eng/main.do

xxiv. Tabachnick, B. & Fidell, L., 2007. *Using Multivariate Statistics.* 5th ed. New York: Allyn and Bacon.

xxv. Wheaton, B., B.Muthen, Alwin, D. & Summers, G., 1977. Assessing Reliability and Stability in Panel Models. *Sociological Methodology,* 8(1), pp. 84-136.