

The Effects of Information and Communication Technology on Human Resource Management: An Empirical Analysis

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Abstract—HR is a management based system that helps to organize the strategic objectives of employers. HR practices mainly focus on the process of maximizing employee's productivity. Due to the importance of HR practices, this research is conducted to determine the effects of Information and Communication Technology on Human Resource Management in the sector of telecommunication. The hypothesis is tested on the sample of 320 employees of telecommunication organizations in Pakistan. The dependent variable is the performance measurement of HR effects and the independent variables are ICT usage on planning of HR, ICT usage on training and development, ICT usage on hiring procedures of HR and ICT usage in evaluation and compensation. The study shows that there is positive correlation of dependent variables with independent variables.

Index Terms—HRM, HR practices, ICT (information and communication technology), telecommunication sector.

I. INTRODUCTION

ICT (Information and communications technology) is an modernized form of information technology (IT), focused on the role of communication, integration of telecommunications, computers, enterprise software, storage, audio visual, which gives access to users of store, transmit and manipulate information. "The managing of information and communication with electronics media such as computers emails, telephones". [1] Technology and HR are strategically important in organizations, in fact usage of ICT with HR makes organization more profitable. However ICT concepts, methods and applications are involved in the improvement of HR department.

"The earlier studies in various disciplines, management, socio-economics, have studied the relationship between ICT and HR". [2-5] "The usage of ICT has been linked with numerous changes in internal business processes, such as organizational structure, job design, requisite employee skills, and so on, aimed at improving flexibility" [6-8] More distinctively, different studies [9-11] create the relation, theoretically and empirically, between the employment effect of organization, ICT reserves and the effect of ICT diffusion on organizational aspects related to human resources.

The organization and workers need to adjust to the use of ICT, and offer pragmatic data, at the organization level, about

the correlation between new organizational practices and labor force characteristics. [12] They analysis that organization that implement innovation related to ICT, redeployment of work, and growth of new products or services, tend to use more experienced workers. lastly, the altering environment of work in the age of e-business, and emphasize considerable changes in the life of the organization, joined with a marked association towards a job market of flexible, fluid groups of highly-skilled, entrepreneurial employees. It may be that achievement in ICT usage are exacerbating the difference in employability between the technology-savvy "haves" and "have not's," also known as the "digital divide". [13] Recent studies point up the connections between ICT and social inequalities, their impact on wages, employment structure, and professional skills, vocational training, etc [14]-[18].

II. RESEARCH METHODOLOGY

"Research Methodology should be chosen as a function of the research situation, while both qualitative and quantitative methods involve weaknesses and strengths". [19]. "It is important that suitable techniques should apply and get the reliable results".

III. SAMPLE

The data is collected from Pakistan telecommunication organizations in which overall 320 employees include. The questionnaire samples were distributed to 400 employees. The minimum sample size is 300. Almost 400 questionnaire samples were distributed. 320 filled questionnaire samples were getting back from employers. This survey conducted out within the January-April 2014.

IV. DEPENDENT VARIABLE AND INDEPENDENT VARIABLES

The questionnaire samples estimated four independent variables of ICT that effect performance measurement of HR. The performance measurement in term of affecting the HR is the dependent variables. And independent variables are 1. ICT usage on Planning of HR that contain 4 items, 2. ICT usage on Training and Development that contains 5 items, 3. ICT usage on hiring procedures that contains 4 items, and 4. ICT usage on evaluation and compensation that contains 5 items

The employers write their choice on 5 scale scheme in which 5 for strongly agree. 4 for Agree. 3 for Neutral. 2 for Disagree and 1 for Strongly Disagree. After collection of data, analyze the results.

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V. THEORETICAL MODEL

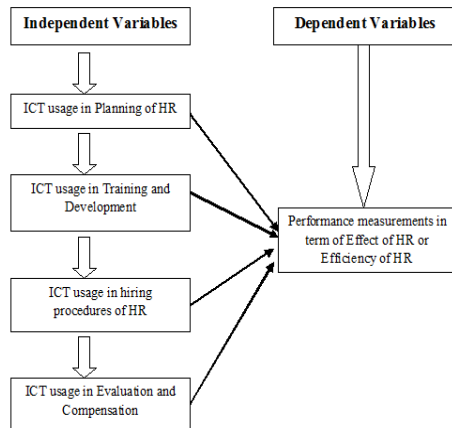


Fig. 1. Theoretical model diagram of independent and dependent variables.

VI. RESULTS AND DATA ANALYSIS

To acquire the results, special statistical tools like IBM SPSS 20. And the techniques were used to analyze data that are as. ANOVA, Histogram, Regression, Correlation, Descriptive statistics (Mean and Standard deviation).

VII. VALIDITY AND RELIABILITY OF DATA

The Reliability Statistics showed that Cronbach's alpha is 0.711 which indicates that it's up to the standard value as shown in Table I.

TABLE I: RELIABILITY STATISTICS

Cronbach's Alpha	No of Items
0.711	4

VIII. DEMOGRAPHIC ANALYSIS

The Questioner distributes to overall 400 employees, but 320 questioners returned. Most of the employers are male workers about 53.1%, and female workers were 46.9%. From Age 20 to 29 years are 42.1% and having work experience from 0 to 5 years. From Age 30 to 39 years are 28.1% and they have working experience from 6 to 10 years. From Age

40 to 50 years are 19.7% and having work experience from 11 to 15 years. Above 51 years 10.1% and having work experience above 16 years respectively. Sales department was the biggest department having 24.1% employees, marketing department having 21.1%. The management department having 20.6%, finance department having 19.1% employees and others have 15.1% respectively. The Education of Employers having 10th Grade are 14.1%, 12th Grade having 16.7%, Bachelors are 36.4% and Masters and PhD having 32.8% respectively.

IX. THE REGRESSION ANALYSIS RESULTS

The regression analysis used to measures the results. The HR model fit for regression and shows Positive significant effect results. To prove the model is fit for findings we use R, R², and Coefficient of determination, variance, analysis of variance (ANOVA) and the t statistic. To prove the impact of independent variable on dependent variable we perform linear regression and the results shown in Tables II to VI.

TABLE II: REGRESSION VARIABLES ENTERED/REMOVED^a

Model	Variables Entered	Variables Removed	Method
1	ICT usage on planning, ICT usage on training and development, ICT usage on hiring procedures, ICT usage in evaluation and compensation ^b		Enter

a. Dependent Variable: Performance measurements in terms of efficiency or effect of HR,

b. All requested variables entered.

TABLE III: REGRESSION ANALYSIS

Variables	R	T-value	B-coefficient	F-value	R ²	p-value
ICT usage on planning	0.511	10.6	0.511 0.472**	112.6	0.26	0.000
ICT usage on training and development	0.392	7.60	0.392 0.378**	57.7	0.15	0.000
ICT usage on hiring procedures, ICT usage in evaluation and compensation	0.352	6.70	0.352 0.356**	45.01	0.12	0.000
	0.180	3.26	0.180 0.179**	10.65	0.03	0.000
N	320	320	320	320	320	320

TABLE IV: MODEL SUMMARY^b

Model	R	R ²	Adjusted R ²	Std. Error of the Estimate	R ² Change	F Change	df1	df2	Sig. F Change
1	.577 ^a	.333	.323	.65560	.333	31.404	4	314	.000

a. Predictors: (Constant), ICT usage in Planning, ICT usage in Training and Development, ICT usage in Hiring procedures, ICT usage in Evaluation and compensation

b. Dependent Variable: Performance measurements in terms of efficiency or effect of HR.

TABLE V: ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	67.489	4	13.498	31.404	.000 ^b
1 Residual	134.960	314	.430		
Total	202.448	319			

a. Dependent Variable: Performance measurement in terms of efficiency or effect of HR

b. Predictors: (Constant), ICT usage in Planning, ICT usage in Training and development, ICT usage in Hiring procedures, ICT usage in evaluation and compensation

X. CORRELATION ANALYSIS

The descriptive statistics shown as in tables that the highest value is 3.2164 and the lowest is 2.8212. The Range

of correlation between the dependent and independent practices are 0.154 to 0.511. All attributes shown positive relationship to significant p values < 0.001 as shown in Tables VII, VIII.

TABLE VII: DESCRIPTIVE STATISTICS CORRELATION

	Mean	Std. Deviation	N
Performance measurement in terms of efficiency or effect of HR	3.0273	0.79664	320
ICT usage in planning	3.2164	0.76349	320
ICT usage in Training and Development	2.8212	0.72660	320
ICT usage in Hiring procedures	3.0338	0.73896	320
ICT usage in evaluation and compensation	3.2887	0.73506	320

TABLE VIII: CORRELATIONS THE DESCRIPTIVE STATISTICS AND CORRELATION ANALYSIS

Variables	Performance measurement in terms of efficiency or effect of HR	ICT usage in planning of HR	ICT usage in training and development	ICT usage on hiring procedures	ICT usage in Evaluation and compensation	
Performance measurement in terms of efficiency or effect of HR	Pearson Correlation	1	.272**	.194**	.154**	.350**
	Sig. (2-tailed)		.000	.000	.006	.000
	Sum of Squares and Cross-products	202.44	52.856	35.914	28.905	101.445
	Covariance	.635	.166	.113	.091	.318
	N	320	320	320	320	320
ICT usage in planning of HR	Pearson Correlation	.272**	1	.231**	.647**	.405**
	Sig. (2-tailed)	.000		.000	.000	.000
	Sum of Squares and Cross-products	52.856	185.95	40.928	116.413	112.477
	Covariance	.166	.583	.128	.365	.353
	N	320	320	320	320	320
ICT usage in training and development	Pearson Correlation	.194**	.231**	1	.374**	.080
	Sig. (2-tailed)	.000	.000		.000	.155
	Sum of Squares and Cross-products	35.914	40.928	168.416	64.131	21.094
	Covariance	.113	.128	.528	.201	.066
	N	320	320	320	320	320
ICT usage on hiring procedures	Pearson Correlation	.154**	.647**	.374**	1	.307**
	Sig. (2-tailed)	.006	.000	.000		.000
	Sum of Squares and Cross-products	28.905	116.41	64.131	174.195	82.62
	Covariance	.091	.365	.201	.546	.259
	N	320	320	320	320	320
ICT usage in Evaluation and compensation	Pearson Correlation	.511**	.392**	.352**	.180**	.170**
	Sig. (2-tailed)	.000	.000	.000	.001	.002
	Sum of Squares and Cross-products	95.523	70.204	59.996	31.201	45.511
	Covariance	.299	.220	.188	.098	.143
	N	320	320	320	320	320

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

XI. HI (HYPOTHESIS I): PERFORMANCE MEASUREMENT IN TERMS OF EFFICIENCY OR EFFECT OF HR

The variance in performance measurement is 51.1% which shows relationship of performance measurement that effects HR are positive and the value of $R=0.511$ $F=112.6$ at $p=0.000$ and t value is 10.6, the results shows there is a positive relationship of performance measurement in terms of efficiency or effect HR. Therefore, based on results Hypothesis I accepted.

XII. HII (HYPOTHESIS II): ICT USAGE IN PLANNING THAT EFFECTS PERFORMANCE MEASUREMENT OF HR

The variance of ICT usage in planning is 51.0%, the value

of $R=0.180$. $F=10.65$ at $p=0.000$ and the value of $t=3.264$. So the results and calculations indicate that the Hypothesis II which is the correlation of ICT usage in planning with performance measurements that affects HR accepted.

XIII. HIII (HYPOTHESIS III): ICT USAGE IN TRAINING AND DEVELOPMENT THAT EFFECTS PERFORMANCE MEASUREMENT OF HR

The ICT usage in training and development affects the performance measurement shows 39.2% variance is positive relationship. The value of $R=0.392$. $F=57.7$ at $p=0.000$ and $t=7.602$ which sows HIII is accepted.

XIV. HIV (HYPOTHESIS IV): ICT USAGE IN HIRING PROCEDURE AFFECTS THE PERFORMANCE MEASUREMENT OF HR

35.2% variance in hiring procedure which indicate the value of $R=0.352$. $F=45.01$ at $p=0.00$ shows the model's goodness of fit, Significant positive relationship between predictor and predicted variable is evident by the value of $t=6.70$. Therefore, based on the results HIV is accepted.

XV. HV (HYPOTHESIS V): ICT USAGE IN EVALUATION AND COMPENSATION AFFECTS THE PERFORMANCE MEASUREMENT OF HR

18.0% variance by evaluation and Compensation affects the performance measurement of HR in term of efficiency or effect of HR, the value of $R=0.180$. $F=10.65$ at $p=0.000$ and the value of $t=0.624$. Hence, on the basis of these results HV is not accepted.

XVI. CONCLUSION

The Research shows 4 indicators that affect the performance of HR in term of efficiency or effect of HR. The different variables were used as hypothesis to check the role of performance measurement in terms of efficiency or effect of HR and the results shows Information and communication technologies significantly affect the HR.

The Statistically Analysis shows independent variables (ICT usage in Planning, ICT usage in Training and Development, ICT usage in hiring procedures, ICT usage in evaluation and compensation affect) have a direct and positive impact on the dependent variable that performance measurement in terms of efficiency or effect of HR. and the ICT usage in evaluation and Compensation effects shows negative relationship. All hypotheses accepted at the significance value of 0.05. Hence we concluded ICT usage is positively significant to performance measurement in terms of efficiency or effect the HR in telecommunication industries in Pakistan.

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