Indian Journal of Fundamental and Applied Life Sciences ISSN: 2231– 6345 (Online)
An Open Access, Online International Journal Available at www.cibtech.org/sp.ed/jls/2015/03/jls.htm
2015 Vol. 5 (S3), pp. 513-519/Banifatemi and Bahramzadeh
Research Article

RELATIONSHIP BETWEEN USE OF INFORMATION & COMMUNICATION TECHNOLOGY WITH ORGANIZATIONAL EFFECTIVENESS & EMPLOYEES' PRODUCTIVITY

Hanzale Banifatemi[1] and *Hosein Ali Bahramzadeh[2]
[1]Department of Management and Accounting, Aliabad Katoul Branch, Islamic Azad University, Aliabad Katoul, Iran
[2]Department of Human Science, Bojnourd Branch, Islamic Azad University, Bojnourd (IRAN)
**Author for Correspondence*

ABSTRACT
The main objective of this study is to investigate the relationship between use of (ICT) with the employees' productivity and organizational effectiveness in Golestan province Gas Company. The study is applied in terms of the objective, as well as descriptive, and correlational type, in terms of collecting data, which has been conducted in 2013-14. Three questionnaires of ICT, productivity of human resources & organizational effectiveness were used. The number of statistical population members was 220 people that from which the sample size was extracted as 140 people, using Krejcie and Morgan table. To analyze the data using SPSS software, the tests of *Kolmogorov–Smirnov* Test, correlation coefficient, Regression, analysis of variance (ANOVA) and linear regression have been used. The findings of the main hypotheses indicate that there is a positive (direct) and significant relationship between the employees use of ICT with the elements of organizational effectiveness (goals, adaptability, integrity, continuity & reliability) and employees productivity.

Keywords: *Information and Communication Technology (ICT), Productivity of Human Resources, Organizational Effectiveness*

INTRODUCTION
What is certain in the new organizations is that their structure relies on the knowledge, not only for the reason that today it is assumed that knowledge has increasingly become important through the growth and the increase of productivity in production, but in this respect that being material and the physical state of materials has become less important and consumption of goods and services similar to computer software, Internet delivery of goods and services and in other words, information and communication technology (ICT) products has increased and this affects the growth and productivity of Iranian organizations (Daghighi *et al.,* 2009). Similarly, the role of ICT in organizational processes, such as production, sales and services delivery grew significantly. The first versions of computer technology were originally used to store the information on organization performance. With the development of ICT systems the ability to collect and use the information simultaneously with their occurrence was provided, and the data were readily and fully available to managers, and later many of the steps to manually record data become as computer and automation information methods and some of reworking was removed in organizational processes that is one of the factors of productivity improvement of human resources (Zargar, 2003).
In fact, the development of information technology in organizations has somehow caused a change in type of jobs, skills, responsibilities and duties of the employees (Kiyani and Bagheri, 2004). ICT has also developed and optimized the organizations internal operations, reduced internal costs and accelerated the delivery of services and products. For this reason, many organizations have understood the importance of information technology and its impact on the speed and accuracy of the affairs flow, greater customer satisfaction (Evans, 2006), support systems, management decision making and ultimately the productivity of human and organizational resources (Yardley, 2000; Kavousi *et al.*, 2012).
Today ICT has been somehow institutionalized in human life. Other smartphones, laptops, computers are out of being luxury and have become as a requirement (Sohani, 2004), and this has caused major changes in the traditional methods. Communication is one of the areas in which technology has advanced faster

and Internet has dramatically influenced it during the past two decades. The Internet has made the world as a small village through which humans can communicate with each other from remote distances and benefit from each other's findings (Yaghoubi & Chizari, 2006). With the growth and more complexity of organizational environments and the increase of competitive environment, the use of ICT in any organization among the units creates coordination in order to increase the efficiency and effectiveness (Mohammadi, 2003). Recent research indicates that the use of ICT facilitates and makes the possibility faster to access to the information for decision making, to take the collaborative work easy and customers' access to the products and services (Madadi *et al.*, 2010). Thus, in this study, the researcher decided to assess the impact of ICT on the development and improvement of human resources productivity and organizational effectiveness in the Golestan province Gas Company. Also the results of research conducted by Dimelis *et al.*, (2011) on the impact of ICT use in the development of the industries: a comparative comparison between America and Europe, showed that the share of long-term use of ICT has had a significant impact on the industries in both Europe and the use of ICT enhances the productivity of the industries. The results of research by Barrow *et al.*, (2009) also showed that the performance of students trained by computer has been dramatically better than the performance of students trained in the traditional way. And researchers named Joseph and Abraham (2007) in a study examined the impact of ICT on productivity in manufacturing industries sector in India and found that the ICT investment level is very low in the manufacturing industries sector, but the investment has a significant and positive effect on total productivity and partial productivity of the sector.

Develop Research Hypotheses

In order to achieve this goal, two main hypotheses and four sub-hypotheses have been formulated.

1. There is a significant relationship between the use of ICT and the employees' productivity of Golestan province Gas Company.
2. There is a significant relationship between the use of ICT and organizational effectiveness of Golestan province Gas Company.

2.1 There is a significant relationship between the use of ICT and the adaptability of employees in the company.

2.2 There is a significant relationship between the use of ICT and the goals achievement by employees in the company.

2.3 there is a significant relationship between the use of ICT and employees' integration and solidarity in the company.

2.4 There is a significant relationship between the use of ICT and employees' continuity and reliability (preserving patterns) in the company.

Theoretical Framework

In the form of the main hypothesis and secondary research hypotheses, the research theoretical framework has shown as the following.

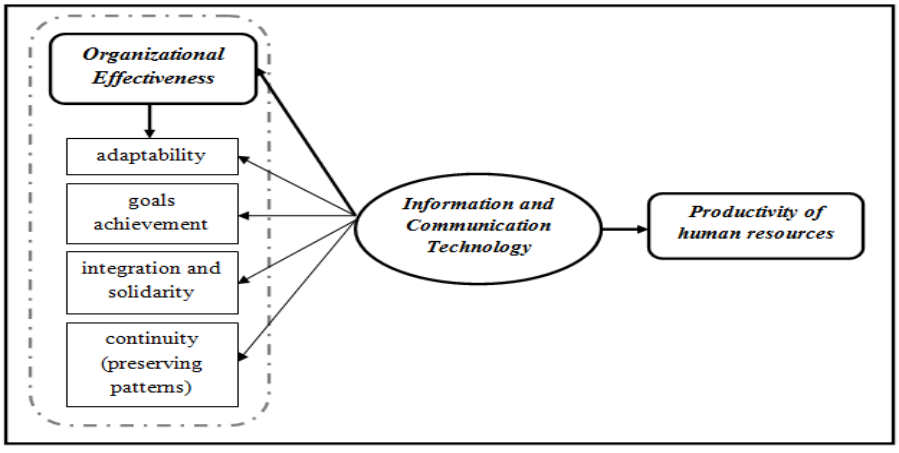

Figure 1: Research theoretical framework

MATERIALS AND METHODS

Research Method

The present study is applied in terms of the objective, as well as descriptive and correlational survey in terms of the method. The statistical population included 220 employees of Golestan province Gas Company that the sample size of 140 people was extracted according to Krejcie and Morgan table and which were selected by simple random sampling. Data collection tools have consisted of a researcher made questionnaire with 24 items and the standard questionnaire of 20 items of human resources productivity by Saatchi (2010) and a 35-item questionnaire of effectiveness by Parsons «AGIL» (1969) (quoted by Hasani and Saremi, 2010), respectively, from which the questionnaires of ICT and productivity were modified. The tools validity was approved by content validity method and using existing scientific literature as well as academics elites' opinion in the fields of organizational behavior and human resources. Their reliability has been also determined using Cronbach's alpha coefficient that the obtained coefficients for ICT, organizational effectiveness, and productivity of human resources were as 0.83 and 0.89 and 0.86, respectively. To test the hypotheses, the Kolmogorov-Smirnov test that confirmed the normality of data was first used and then the statistical methods such as Pearson correlation coefficient, variance and regression testing has been used.

Analysis of the Data

Table 1, contains information on the mean and standard deviations and Cronbach alpha of the variables of ICT, productivity human resources and organizational effectiveness.

Table 1: Descriptive statistics of research variables

Sample Size	Items	Alpha's Cronbach	Standard deviation	Average	Variable
140	24	0.83	0.305	2.15	**ICT**
140	20	0.86	0.385	2.87	**productivity HR**
140	35	0.82	0.452	2.73	**organizational effectiveness**
140	8	0.81	0.428	2.44	**goals achievement**
140	9	0.80	0.476	3.00	**adaptability**
140	9	0.84	0.454	2.80	**integration & solidarity**
140	9	0.81	0.475	3.00	**continuity & reliability**

As it can be seen in the table above, the mean of ICT is 2.15, which according to 5-point Likert scale, indicating the low use of the employees of ICT. The other component is in a relatively good level among which "flexibility" and "continuity and reliability" have the highest level and the components of "ICT" and "purpose achievement", have the least level, respectively, indicating that the organization should follow the use improvement and development of ICT and employees' effectiveness. Also, in Cronbach's alpha section that is the reliability test of questionnaires, it shows that their reliability and validity, since it is higher than 0.70 (H0: Alpha $\geq$ 0.70), is approved.

Table 2: Test results Kolmogorov-Smirnov

Tests of Normality Variable	Test Statistic	Degrees of freedom	Sig.	Results Test
ICT	0.296	140	0.000	N.D
productivity HR	0.129	140	0.001	N.D
organizational effectiveness	0.151	140	0.000	N.D
goals achievement	0.111	140	0.012	N.D
adaptability	0.166	140	0.000	N.D
integration & solidarity	0.073	140	0.036	N.D
continuity & reliability	0.141	140	0.000	Normal Distribution

As it can be seen in the table above, due to the nature of the research, to analyze data the Kolmogorov-Smirnov test was first used to make sure of the normal distribution of data (P>0/05) and the results are shown in Table 2 indicating that, according to the results and the value Asymp. Sig. (2-tailed), which is less than 0.05, the null hypothesis is rejected, i.e. the hypothesis on "the desired sample has been obtained from a normal distribution" is confirmed. And to analyze the research hypotheses, Pearson correlation coefficient (P <0/05) for determining the predictor variable and the test for the significance of coefficients, analysis of variance and simple linear regression were used

Table 3 shows Pearson correlation coefficient of the research variables (ICT with human resources productivity and organizational effectiveness) along with the error level of 0.01 and based on the value of Anova (Sig) = (0.000). As you can see, there is a positive and strong correlation between ICT and productivity of human resources, indicating there is a kind of convergence and direct relationship between the information and communication technology and productivity. Also, there is a positive and significant relationship between the effectiveness with its components. That the variable of ICT with the component of "organizational goals achievement" with a correlation coefficient of (r = 0/513, P ≤ 0/01) has the highest correlation, as the relationship between the ICT variable with the component of "integration and solidarity" with a correlation coefficient of (r = 0/156, P ≤ 0/01) has the lowest correlation. This means that by expanding the use of ICT and necessary training to achieve the skill of applying ICT in the organization, the base of increasing human resources productivity and the percentage of achieving organizational goals and effectiveness could be provided.

Table 3: The results of the Pearson correlation test research hypotheses

Approval or disapproval	Anova(Sig)	N	Correlation coefficient	Variable	Row
Approval	0.000	140	**0.555**	ICT & productivity HR	1
Approval	0.000	140	**0.393**	ICT & effectiveness	2
Approval	0.000	140	**0.382**	ICT & adaptability	3
Approval	0.000	140	**0.513**	ICT & goals achievement	4
Approval	0.000	140	**0.156**	ICT & integration	5
Approval	0.000	140	**0.323**	ICT & continuity	6

As it can be observed in table 4, the value of the correlation coefficient that is presented by mark R shows intensity of the relationship between the two variables indicating intensity of the relationship of ICT with productivity is equal to (R = .555a). Moreover, the coefficient of determination obtained that shows the percentage amount of changes of dependent variables that are determined by independent variables is equal to (R2 = .308) for productivity. Also, the multiple correlation coefficient and the coefficient of determination between the components of ICT with effectiveness (R = .393, R2 = .218), ICT with adaptability (R = .382, R2 = .146), ICT with objectives achievement (R = .513, R2 = .246), ICT with integration and solidarity (R = .156, R2 = .127), ICT with continuity and reliability (R = .323, R2 = .104) has been determined in this way.

Table 4: Multiple Correlation coefficient and Coefficient of determination of Research variables

Model	Model Summary[b] Correlation coefficient (R)	(R2) R Square	Adjusted R Square
productivity HR	0.555[a]	0.308	0.303
effectiveness	0.393[a]	0.218	0.210
adaptability	0.382[a]	0.146	0.140
goals achievement	0.513[a]	0.246	0.258
integration	0.156[a]	0.127	0.091
continuity	0.323[a]	0.104	0.098

According to the results of table 5. the regression analysis indicate that ICT has the power of predicting the variables of human resources productivity and organizational effectiveness, and has the relation and impact on the criterion variable (productivity and effectiveness) and based on the results of the Beta, for 1 unit increase in ICT, the value of criterion variables will increase as 0.052 units. Similarly, the predictive variable, for 1 unit increase in ICT, the value of increased productivity 0.055. And for 1 unit increase in ICT, the value of effectiveness will increase as 0.051 units. As well, for the variable components of effectiveness the value of Beta is noted. These findings are consistent with the research hypotheses and confirm them.

Table 5: The significant Research variables in the regression

Denotative Correlation table						
Model		**Unstandardized coefficients**		**standardized coefficient**	**t**	**Sig**
		B	**Std. error**	**Beta**		
1	**Constant**	3.398	0.160	0.052	20.054	0.000
	ICT & productivity HR	0.477	0.061	0.061	7.835	0.000
	ICT & effectiveness	0.393	0.051	0.051	5.021	0.000
	ICT & adaptability	0.245	0.050	0.050	4.859	0.000
	ICT & goals achievement	0.365	0.052	0.052	7.027	0.000
	ICT & integration	0.239	0.053	0.053	4.478	0.000
	ICT & continuity	0.208	0.052	0.052	4.010	0.000

Discussion and Conclusion

The ultimate goal of this study is to investigate the relationship between employees' use of ICT with human resources productivity and their organizational effectiveness in Golestan province Gas Company. In order to achieve the goal, the results suggest that ICT has a positive and significant relationship with employees' productivity with a correlation ($r = 0/555$, $P \leq 0/01$) and organizational effectiveness ($r = 0/393$, $P \leq 0.01$), that in line with the research hypotheses there is also a significant and positive relationship between ICT with the variable components of effectiveness.

According to the result of statistical data extracted from the statistical sample, it can be stated that employees of the organization averagely use of information and communication technology, as well as describing the productivity and effectiveness, the organization has obtained the average rating getting poor. Based on the established predicates to do an investigation between the variables, this means that lack of appropriate use of information and communication technology has adjusted the productivity and effectiveness of the organization. But it is worth noting that among the descriptive statistics of the research variables, the components of adaptability and preserving patterns with the mean of 3.00, the percentage of variables and the variable of ICT with the mean of 2.15 is at the bottom end of the table. Also among the inferential statistics and the relationship between the research variables, the highest correlation is between the variables of "information technology with productivity of human resources" with a correlation coefficient of (0.555) and "information technology with organizational goals achievement " with a correlation coefficient of (0.513), and the lowest correlation is related to the variables of "information technology with integration and solidarity between employees" with a correlation coefficient of (0.156), respectively. To justify such a relationship, it can be said that: to develop and improve the use of ICT, as well as the productivity and organizational effectiveness, senior managers and strategic individuals of the organization in cooperation with middle managers and employees should take these variables into more and better consideration, and developing and applying existing new technologies and attracting and maintaining qualified personnel and required training they could improve the use of ICT To achieve the goals of Golestan province Gas Company.

Also, the results of the present study on the relationship between ICT with employees' productivity and organizational effectiveness is consistent with other studies by researchers such as Madadi *et al.,* (2010), and Behan and Holmes (2000) that found the use of ICT provides the possibility for better and faster to access and causes the development of human resources effectiveness through on time saving the time and cost and investment, as well as the research by Khalatbari *et al.,* (2010) and Colecchia & Schreyer (2002) and Daghighi *et al.,* (2009) and Evans (2006) that showed that ICT increases the power of productivity and efficiency of the organization members and their activities.

Practical Suggestions

It is recommended due to recent advances in technology and the increasing rise of competitive environment and the need to use new technologies it is necessary for the managers of Iranian Gas Company to try their best for the use of ICT, and setting up training programs while servicing and attracting the specialists, efficiently use of the technology in the improvement of productivity of human resources. The managers in organization under studied are also recommended to provide a list of their organizational operations such as: wage and salaries, the issuance of employment provisions, inventory forecasting, production planning and distribution and workforce expertise, costing industrial uses and other specialized tasks such as operational application areas of information technology, and deal with strengthening and applying ICT in the areas, because in this level computer would cause the expand of automated work and administrative affairs, therefore it will be resulted in doing more economical things quickly. According to the results of third sub-hypothesis, which indicates a weak relationship between information technology with integration and solidarity among employees and this means that with the development of technology and technological networks, teleworking and communication are done in long distance and without the need of physical presence that causes the poor social relationships between employees. It is proposed to administrators to having a special look at the management of interpersonal relationships, and using the knowledge leadership, in electronic and technological communications networks, they need to promote the values, common cultural thoughts and beliefs and create personal relationships between the network users within the specified range. In this way, social and cultural integration and solidarity among employees would be strengthened and ultimately it will improve and enhance the organizational effectiveness.

ACKNOWLEDGEMENT

We are grateful to Islamic Azad University, Aliabad katoul branch authorities, for their useful collaboration.

REFERENCES

Asl A, Daghighi Ghavidel S and Bahrami ZP (2009). The effect of ICT on labor productivity in the banking industry. *Journal of Economic Sciences* **1**(4) 25-56 [Presian].

Barrow L, Markman L and Rouse CE (2009). Technology edge: The educational benefits of computer-aided instruction. *American Economic Journal, Economic Policy* (1) 52-74.

Behan K and Holmes D (2000). *Familiarity with Information Technology*, translated by Azarakhsh M and Mehrdad J (Tehran, Samt publication) [Presian] **2001**.

Colecchia A and Schreyer P (2002). ICT investment and economic growth in the 1990s: is the United States a unique case?: a comparative study of nine OECD countries. *Review of Economic Dynamics* **5**(2) 408-442.

Dimelis SP and Papaioannou Sotiris K (2011). ICT growth effects at the industry level: A comparison between the US and the EU. *Information Economics and Policy* **23**(1) 37-50.

Evans L (2006). Using student podcasts in literature classes. Available: http://www.academiccommons.org/ctfl/vignette/using-student-podcasts-in-literature-classes [viewed 23 Jan 2007].

Hassani M and Sameri M (2010). An investigation on organizational effectiveness of secondary schools in Urmia region one using Parsons Model. *Organizational Culture Management* **8**(21) 201-223. [Presian].

Joseph K and Abraham VJ (2007). Information technology and productivity: Evidence from India's manufacturing sector. *Working Paper* 389.
Kavousi A, Hashemi M, Islam Panah M and Sarfarazi M (2012). The study of using information technology and its role in enhancing organizational productivity. *Sanatekafsh Monthly Magazine* **19** [Presian].
Kayani HK and Bagheri GHM (2014). The impact of ICT on labor productivity and wages in the industries of Tehran province. *Humanities Peyke Noor Journal* **2**(4) 28-46 [Presian].
Khalatbari J, Hosseini Tabaghdehi SL and Zamani A (2010). The impact of applying information and communication technology on the efficiency and effectiveness of technical and vocational training organizational staff in Mazandaran province. *Information and Communication Technology (ICT) in Educational Sciences* **1**(1) 93-102 [Presian].
Madadi Y, Moniyan A and Asgharizadeh A (2010). An investigation on the role of information technology on the effectiveness of knowledge-based organizations (case study: University College of Agricultural & Natural Resources, University of Tehran). *Iranian Journal of Agricultural Economics and Development* **41**(2) 413-423 [Presian].
Mohammadi F (2013). Information technology recognition. *Educational Technology Monthly Magazine* (4) [Presian].
Saatchi M (2010). *Productivity Psychology (Functional Dimensions of Work Psychology and Industrial and Organizational Psychology)*, second edition & fourth edition, Nashre Virayesh Institute [Presian].
Sohani Sh (2008). Review of effective factors of information technology educational and research activities of shahid beheshti & Tehran University, Faculty members, M.Sc dissertation, University of Tehran.
Yaghoubi J and Chizari M (2006). Review the effects of accept and usage of internet in educational and research activities for higher educational students of agricultural extension and development major. *Agricultural Sciences Journal* **37**(1) 85-92 [In Persion].
Yardley D (2009). *Successful Management of IT Projects: Lessons from the Failure of Information Technology Projects*, translated by Nasr Azadani B (Arkane Danesh Publications) 1-10 [Presian].
Zargar M (2013). Information technology, human resources reengineering. *Tadbir Monthly Magazine*, Industrial Management Organization publication no. 94, 20-27 [Persian].