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EFFECT OF INFORMATION COMMUNICATION TECHNOLOGY ON HUMAN RESOURCES PRODUCTIVITY OF THE IRANIAN NATIONAL OIL COMPANY

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ABSTRACT
The present study's goals are to investigate the effect of Information Communication Technology (ICT) dimensions on work force productivity. The statistical population of the study was all managers and staff members working in different areas related to ICT of Iranian National Oil Company in 2010-2011 (N> 11000). A questionnaire (with Cronbach's Alpha coefficient of 75%) was used as the data collection method. The findings of the study indicated that the dimensions of ICT affect human resources productivity. The demographic variables of education level and the type of available jobs had effects on the Internet dimension of human resources productivity of the company.

Keywords: Human Resources Management; Information Communication Technology; Productivity.

1. INTRODUCTION
The application of Information Technology (IT) has a great standing among basic industries since it plays an important role in different industries with factors such as productivity, social services and job opportunity improvement. Therefore, technology can be taken as one of the strategic factors which can help improve business productivity (Yang et al., 2007). Information Technology began in 18th century along with Industrial Revolution and continued to the present day and it is still being used in different organizations to improve business operations (Harris & Nelson, 2008). Productivity improvement, service quality improvement, Cost reduction, Individual's job satisfaction and long-term profitability are among the expectations of those researchers dealing with Information Communication Technology (ICT) (Law and Jogaratnam, 2005). These researchers have also realized the controversial and useless results of productivity as a result of the analysis of investment activities in many industries. However, many studies validate the effect of information technology on productivity, service quality improvement and long-term profitability (Karadag & Dumanogl, 2009). Researcher's studies on productivity (Law and Jogaratnam, 2005) indicate that information technology investment has positively affected productivity from 1995 to 2003.

Information technology is known as the last officially recognized revolution in the history of mankind. It affects all areas of business, society and global life and is developing at an unbelievable speed. This technology has a considerable effect on globalization and is a revolution in information, knowledge and organizational changes (Pavic et al; 2007). Information technology is a term which covers the concept of technology in information production, processing, retrieval and the distribution cycle. Furthermore, it is a new way of obtaining and processing information which allows discontinuous activities to be analyzed in a more effective way. This technology has brought a lot of advantages for customers and industries and helps them have options when choosing various products and services in the

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international market. It helps companies find new ways of improving their market share by providing their customers with their immediate needs (Phuong, 2008). Information technology implementation is very costly for organizations. These charges are not compensated in public organizations until it is followed by cost reduction, productivity and service delivery, quality improvement, increasing the capacity of the public organization's decision-making and efficiency improvement systems and providing better access to information (Gichoya, 2005). Unfortunately companies have fundamental and financial limitations, inefficient and incompatible information systems, different organizational cultures and leadership styles, skilled and semi-skilled staff and attitude problems. Such limitations hinder the process of IT implementation (Ndou, 2004). Information Technology is defined as different types of technology which process, store and send information electronically. Brady et al (2008) believe that obtaining high efficiency and effectiveness in organizations require investment in information technology components such as the Internet (Deeter-Schmelz & Kennedy, 2004), office automation (Geiger & Turley, 2003) and management information systems (Li, 1995). The Internet is a global network of computers which work independently and offers a variety of useful tools such as e-mail, web and news groups (Obra et al., 2002). Most companies use the Internet and know it to be a boost for the national economy (Martin & Matlay, 2001) with much more effectiveness and profitability than with telephone, fax etc (Grandon & Pearson, 2004). Administrative automation systems are one dimension of information and communication technologies which creates oral, written or video output

Administrative automation systems also correlate, store, display and transfer the information (Helm, 1986). All office works are organized through software systems in a full office automation system with the purpose of creating an office system without papers to improve productivity.

Another dimension of Information Communication Technology is a management information system which is a unified part of the comprehensive management system in an organization. This system involves planning for organizational sources and information systems with the operational result of supporting organization decisions (Rensena et al., 2010). Management systems support management activities at all levels and offer some key indices in the process (Folinas, 2007). Since these systems can be used as middle managers, many human managers are against the creation of such systems in the organization. The establishment of ICT systems affects human resources productivity as well. Human resources productivity is a dimension of overall productivity and is defined as the number of hours an individual is working. Josephine and Iwe, (2005) define productivity as measuring human resources efficiency in the context of different situations. Economists believe that Labor productivity is a key factor for economic health and more importantly economic growth. Therefore, an improvement in living standards should follow human resources productivity (Battisti and Iona, 2009).

Information Technology as a new form of human resources technology is rapidly affecting business and lifestyles, especially productivity and thus leading to a wide range of changes in all activities (Zafiropoulos, 2006). Most organizations are investing in Information Technology for more efficiency and profitability (Brady et al., 2008). Information Technology is considered in most industries as one of the strategic factors for business process improvement and an increase in human resources productivity. Williams and Clark (2007) report in their studies that most companies invest heavily in Information Technology for obtaining better business feedback. Loukis and Sapounas (2004) support the relationship between Information Technology and performance. However, many Small and Medium Enterprises (SMEs) are hesitant about investment in this technology and do not believe it to be a strategic resource (Carr, 2003). One of the reasons these companies do not use this technology is that their managers do not use it completely (Maguire et al., 2007) and do not have enough skills for its

full use (Chibelushi & Costello., 2009).

The increasing importance of Information Technology in promoting human resources productivity in the organization is inevitable. The present study aims to investigate the relationship between the dimensions of Information Communication Technology. (Information Technology, management information systems, office automation, intranet, and the Internet) in order to increase productivity.

The main goal of the present study is investigating the effects of Information Communication Technology and its multi-dimensional impact on human resources productivity. The methodology of this study follows a descriptive typology with a statistical database and practical field observations in order to achieve its research and performance goals. We used questionnaires for data collection and used statistical methods for analysis. In the next section, methodology of this research investigation is described. Then, we offer results of the evaluations in Section 3. Finally, we describe conclusion of this research in Section 4.

2. METHODOLOGY

This study is of descriptive-statistical type and is practical regarding its goals and aims. The present study aims to investigate the multi-dimensional effect of Information Communication Technology on human resources productivity. The statistical respondents of the study were all managers and staff members working in different areas related to Information Communication Technology in the Iranian National Oil Company in 2010-2011. Simple random sampling was used and 159 individuals were chosen for the sample group. A questionnaire was used as the data collection method based on a Likert Scale ranging from completely disagree (1) to completely agree (5).

The study was validated using expert comments and the reliability of the questions was approximately calculated at 78% using Cronbach's Alpha co-efficient. A single variable t-test, Friedman and variance analysis tests were used for data analysis of the study.

3. RESULTS AND DISCUSSION

The results of the study indicated that 56 percent of test takers were in the age bracket from 37 to 55 years of age and a majority of them were employees and held B.A. degrees. Also 74.2 percent of them had at least 20 years of work experience in their profile with the company. Although all the components of Information Technology played a role in human resources productivity, but the results of Friedman test in table 1 revealed that variable priorities are not equal at significant level of 0.05. So the Information Technology (IT) component with a mean of 4.52 has the upper hand in human resources productivity. The Internet with a mean of 1.53, on the other hand, came last in terms of overall effect.

Table 1 The results of Friedman test on grading dependant variables of the study

Independent Variables	Mean	Sig. Level	
Information Technology	4.52	0.000	
Information Management System	3.34		247.264
Internet	1.53		
Office Automation	3.39		
Internet	2.24		

The effect of Information Communication Technology on human resources productivity is analyzed based on demographic variables (age, educational level, job and working background)

in the first section of this study. Therefore, the ANOVAs test was used for purposes of variance analysis. The result of the effect of Information Communication Technology on human resources productivity based on an age variable is shown in Table 2.

The results show that the observed F was not significant at the level of (0.05). Consequently, there were no significant differences between the answers of test takers at different ages so that age is not a significant factor. Table 3 illustrates the results of variance analysis tests on the effect of Information Communication Technology on human resources productivity based on their level of education.

Table 2 The results of variance analysis test on the effect of Information Communication Technology on human resources productivity based on an age variable

Sig. Level	F	Independent Variables
Independent Variable	1.210	0.309
Information Technology	0.330	0.857
Internet	0.686	0.602
Office Automation	1.851	0.122
Intranet	1.083	0367

Table 3 The results of variance analysis test on the effect of Information Communication Technology on human resources productivity based on their level of education

Sig. Level	F	Independent Variables
Independent Variable	0.297	0.827
Information Technology	0312	0.817
Internet	9.114	0.000
Office Automation	2.491	0.062
Intranet	1.153	0.330

The results show that the observed F was significant at the level of (0.05) only for the Internet component. Consequently, there was a significant difference between the answers of test takers with different levels of education on the effect of the Internet on human resources productivity. The results of the effect of Information Communication Technology on human resources productivity based on their job titles are summarized in Table 4.

Table 4 The results of the effect of Information Communication Technology on human resources productivity based on their job titles

Sig. Level	F	Independent Variables
Independent Variable	0.513	0.6
Information technology	0.173	0.842
Internet	7.262	0.001
Office Automation	0.057	0.944
Intranet	1.227	0.296

The results show that the observed F was significant at the level of (0.05) only for the Internet component. Consequently, there was a significant difference between the answers of test takers with different job titles on the effect of the Internet on human resources productivity. Furthermore, the results of the effect of Information Communication Technology on human resources productivity based on their working background are summarized in Table 5.

Based on the observed F, none of the independent variables were significant at the level of (0.05). Therefore there were no significant differences between the answers of test takers with different working backgrounds on the effect of Information Technology on human resources productivity in any dimension.

Table 5 The results of the effect of Information Communication Technology on human resources productivity based on their working background

Sig. Level	F	Independent Variables
Independent Variable	0.225	0.924
Information Technology	0.059	0.994
Internet	1.634	0.168
Office Automation	1.096	0.361
Intranet	1.135	0.342

In the second part of the study, the research questions were analyzed. The major purpose of this study is to investigate the multi-dimensional effect of Information Communication Technology on human resources productivity. Thus, a single variable t-test was used for the analysis of each question of the study and the results are summarized in Table 6.

Table 6 The results of a single variable t-test for the analysis of each question of the study

Independent Variables	Mean	T	Sig. Level
Information Technology	4.3218	21.951	0.000
Information Management System	3.9227	13.857	0.000
Office Automation	3.8553	21.615	0.000
Internet	3.2035	6.798	0.000
Intranet	3.3826	7.456	0.000

The first question is on the multi-dimensional effect of Information Communication Technology on human resources productivity. According to the above table, the mean is higher than the expected. Furthermore, the observed 't-factor' is significant at the level of 0.05. So it can be concluded that Information Technology has increased human resources productivity at a higher rate than originally expected. On the other hand, the results related to the effect of a management information system on human resources productivity shows the calculated mean. The observed 't-factor' is significant at the level of (0.05). So it can be concluded that management information system has increased human resources productivity at a higher than average rate. The third question is about the effect of office automation on human resources productivity. According to the results of the above table, the mean is at a higher level than the expected and the observed 't-factor' is significant at the level of (0.05). Consequently, office automation has increased human resources productivity at a higher than average rate. The same instance turned out to be true about the effect of Internet and intranet on human resources productivity and all the personnel were willing to use more Internet and intranet in their organization after the study.

4. CONCLUSION

The main results of this study showed that using of Information Technology (IT) had a considerable effect on managerial, organizational and human resources productivity. According to statistical tests include in Tables 1 to 6, the IT indices including office automation, intranet,

information management system, and Information Technology increased human resources productivity at a higher than average rate. An increase in human resources productivity was the result of reducing information access time, reducing costs of saving information, increasing speed of works, etc. It was observed that the Iranian National Oil Company is a highly bureaucratic organization and that this bureaucracy had possibly caused losses in human resources productivity. Using IT tools helped the organization to reduce organizational complexity and to increase human resources productivity. It seems as if Iranian National Oil Company needs to make more investments in teaching ICT techniques to its employees in order to have more desired improvements in human resources productivity.

In this study there was no significant difference between the answers of test takers based on their age. The respondents applied this technology equally, but the results of a similar study by Koning and Gelderblom (2006) do not validate this finding. Koning and Gelderblom (2006), believe that older personnel used ICT significantly less than younger personnel. Apparently, variables like level of education and job have a more significant effect on the increase in human resources productivity.

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