A note on Information Technology and Productivity

Fakhradin Misagh[1], Seyyed Mohammad Mirian Aghdam[2], Nader Rafati Maleki[1], Hassan Ranjbari Dostbagloo[1]

[1.] Department of Mathematics and Statistics, Tabriz Branch, Islamic Azad University, Tabriz, Iran
[2.] Department of Management, Maku Branch, Islamic Azad University, Maku, Iran
Corresponding author Email: misagh@ iaut.ac.ir; fmisagh@gmail.com

Abstract: The present research has been done to study the affect of applying Information Technology (IT) on productivity of East Azerbaijan Telecom (EAT). The research method is of descriptive-survey and the studied sample consisted of 150 managers and staff members of The communications company of East Azerbaijan province of Iran who were chosen by using stratified sampling method. The researcher made Questionnaire has been used to collect research data. We use Kolmogrov Smirnov, Wilcoxon Signed Ranks and Paired Samples T-Student tests to confirm or reject the hypotheses. The findings shows that using Information Technology (IT) has increased the productivity of EAT. The obtained results show that applying IT has caused to increase effectiveness and promote creativity and skill in EAT. Furthermore, it increases performance and efficiency.

1. Introduction

Technology is going to perform a critical role in 21st century as most organizations will have to apply one of different kinds of technologies as a way to renew productivity and increase their flexibility and ability to compete [2]. By extension of trading activities, globalization and fast changes of technology, it's essential to oblige organizations to tend required flexibility and such an important task isn't accessible unless using Information Technology (IT), so nowadays, applying IT is necessary and inevitable for all organizations [5].

During recent years, applying modern Information and Communication Technology (ICT) has been regarded by officials of public department to develop efficient organizations and offer fast services in most of countries.

Understanding the applications of IT in state departments and its role to improve public departments has made all politicians in different societies to create characteristic and executive fundamentals of applying IT in public departments [3].Unfortunately, in countries such as Iran, most of investments on communication technology has not acquired expected productivity [9].

A lot of surveys have been done about impact of applying Information IT to explore different dimensions and aspects. Ref. [1] consists of a main hypothesis as "Applying IT cause to increase performance" and 2 subordinate hypotheses with subjects "Applying IT causes optimum application of human sources" and "Applying IT causes optimum application of informational resources" which has been confirmed. Ref. [4] studied "analytical approach in office automation and its impact on productivity of the national oil products distribution company of Shahrood region". It's main hypothesis is "applying office automation caused to increase productivity in the national oil products distribution company of Shahrood regional" was confirmed with 95% of confidence.

Impact of IT on productivity of Sistan and Baluchestan Region electric company has been studied in [6]. The mentioned research consists of a main hypothesis **"**Applying IT is related by productivity increasing" and 4 subordinate hypotheses about increasing performance, effectiveness, to improve operation and to promote creativity and skill**.**

Studies accomplished by The Standish Group about planning systems of enterprise resources in 232 different industries indicated that 51 percent of these projects weren't successful and in 46 percent of these cases, organization never applied system to improve its own possibilities. It was also proven that about a third of IT related projects was stopped before being completed. This research also indicated that more than half of projects costed twice more than anticipated budget [8]. It was declared in another report that more than %70 of IT projects don't supply the determined advantages [11].

2. Statement Of The Problem

Governmental officials are trying severely to divert administrative, scientific, and educational system of country from traditional space toward Information Base Society (IBS) and Management Information Systems (MIS). Applying IT and Information Systems in any organization in order to increase

productivity are challenging duties of modern managers [7, 10]. Limitedly since 2000 and severely since 2002, EAT has applied IT to increase productivity and create a required condition to achieve E- Government. Preceding this policy, researchers have been persuaded to do exploratory studies to study the impact of applying IT on productivity. Despite the majority of employees affirmation about increased productivity due applying IT, some of employees as IT users had contradictory remarks with majority opinion. In other words, unlike company management's expectation of increased productivity, there is a possibility of ineffectiveness or less effectiveness on productivity improvement.

 Some of employees and experts expressed that despite applying IT, most of company activities are done manually "written down on a paper" or manually by computer "sign in computer". In other words, we observe a kind of redoing in EAT. This problem may be caused because of following reasons:

a. Managers have inadequate acquaintance with IT and its requirements.

b. Managers have illogical inclination to sign documents.

c. Managers and staffs don't trust on documents which are developed by IT.

c. There is weakness of specialized soft-wares which may be used in different units of the company. Even though, existent soft-wares are disabling to respond user's requests;

d. There is lack of creating required fundamentals before applying IT.

Hence, the important question which is followed here is: Does applying IT cause to increase productivity in EAT? With regarding the components of productivity; we have studied 4 following purposes:

1. Studying impact of applying IT on effectiveness in EAT.

2. Studying impact of applying IT on promotion of creativity and skills of managers and staffs in EAT.

3. Studying impact of applying IT on efficiency in EAT.

4. Studying impact of applying IT on performance improvement of managers and staffs in EAT.

2.1 Hypotheses

The main hypothesis of this research is "From EAT managers and staff point of view, applying IT increases the productivity" and we have four inferior hypotheses as follows:

I. Applying IT increases effectiveness in EAT.

II. Applying IT promote the creativity and skills of managers and staffs in EAT.

III. Applying IT increases efficiency in EAT.

IV. Applying IT improves performance of managers and staffs in EAT.

3. Research Methodology

We have utilized observational research method and face to face interview to be more acquainted with EAT, choose the best indicators, increase the validity of questionnaire and inform them about the subject of the research and assuring them about the necessity of doing research. In this way, we succeeded to persuade EAT managers and staffs to spend time and give correct and appropriate answers. The questionnaire is researcher made with double position i.e. before and after applying IT. It has of 3 parts: in first part, the subject and a brief introduction to research has been presented. In second part, there are five biographic and the third part consists of 34 five-choice questions that 10 first questions measure the effectiveness, next 11 questions are related to performance evaluation, 8 questions measure the efficiency and 5 last questions are related to promotion of creativity and skill.

In order to ensure about reliability, we distributed the questionnaire between 20 people as prototype and Chronbach's alpha value was 0.87 which is acceptable and appropriate.

Statistical population of this research consists of AT managers and staffs. We ought to consider some members of population who attended EAT in both different positions: the position in which the company didn't utilize IT and another one that company utilized facilities such as Office Automation Network (OAN) and Management Information Systems (MIS). The population size is 627 who are 34 managers and 593 employees. We have used stratified sampling method to choose sample members and according to Morgan's table, the sample size is 150.

4. Hypothesis Testing

In this research, we use following statistical tests to confirm or reject the proposed hypotheses.

I. Kolmogrov Smirnov.

II. Wilcoxon Signed Ranks (WSR).

III. Paired Samples T-Student (PST).

Kolmogrov Smirnov Test is used when the researcher wants to determine the normality or abnormality of a distribution. If a variable doesn't possess a normal distribution, we use non-parametric test about it. According to table 1, the variables effectiveness and promotion of creativity and skill don't follow normal distribution. So we used WSR to check hypotheses (I, II), whereas we use PST for confirmation or rejection hypotheses (III, IV).

Table 1: Kolmogorov-Smirnov test results

Position	Statistics	Effectiveness	Promotion of creativity and skills	Efficiency	Performance improvement
Before Applying IT	Kolmogrov-Smirnov Z	1.204	1.843	1.170	1.050
	Sig. (2-Tailed)	0.110	0.002	0.130	0.220
After Applying IT	Kolmogrov-Smirnov Z	1.407	1.384	1.158	1.015
	Sig. (2-Tailed)	0.038	0.043	0.113	0.254

4.1. Testing Hypotheses (I, Ii)

To test the null hypothesis of no difference in the medians of two paired populations $H_0: \eta_1 = \eta_2$ against the alternative that the medians are not the same $H_1: \eta_1 \neq \eta_2$, we use the WSR test for testing the difference in two medians η_1 and η_2. We apply WSR for testing the hypotheses (I, II) and the results are depicted in table 2.

According to table 2, we observe that p-*values* $= 0.000 < 0.05$, so that the null hypothesis of no difference between effectiveness and promotion of creativity and skills before and after applying IT in EAT are rejected.

We conclude that there is evidence of significant increasing efficiency and promotion of creativity and skills.

Table 2: Wilcoxon signed rank test results

Statistics	Effectiveness (After-Before)	Promotion creativity and skills (After-Before)
Total Number	149	149
Missing	1	1
Neg. Ranks	148	142
Sum of Neg. Ranks	11167	10583
Mean of Neg. Rank	75.45	74.52
Z	-10.587	-9.143
p-*value*.	0.000	0.000

4.2. TESTING HYPOTHESES (III, IV)

The paired samples T-test is used to determine the difference in the means of two paired populations, i.e. $H_0: \mu_1 = \mu_2$ against $H_1: \mu_1 \neq \mu_2$. We apply PST for testing the hypotheses (III, IV) and the results are depicted in table 3.

According to table 3, we observe that p-*values* $= 0.000 < 0.05$, so that the null hypothesis of no difference between efficiency and performance increasing before and after applying IT in EAT are rejected. We conclude that there is evidence of significant increasing efficiency and performance.

Table 3: Paired samples T-test results.

Statistics	Efficiency (After-Before)	Performance improvement (After-Before)
Total Number	149	149
Missing	1	1
Mean	1.427	1.462
Standard Deviation	0.55431	0.55422
Standard Error	0.04541	0.04540
t	31.431	32.214
df	148	148
p-*value*.	0.000	0.000

5. Discussion

The results of studying first hypothesis show that applying IT in this company has caused to increase effectiveness from EAT managers and staffs point of view. This is agreed with the findings of [4, 6]. Due to findings of second hypothesis, applying IT in EAT has caused to Promotion creativity and skills of EAT managers and staffs. This finding is consistent with [6]. The 3rd hypothesis indicates that applying IT in this company can cause to increase efficiency which is consistent with [6]. Due to findings of 4th hypothesis, applying IT in EAT has caused to improve the performance of EAT managers and staffs. This finding is conistent with the projects of [1, 4].

Using IT in organizations especially state organizations is a new and innovative phenomenon in Iran and some of employees show resistance on it. In order to achieve the nominative goals, it is necessary making usage of such new and innovative technologies and also facilitating the optimal use of it. It is also recommended for senior managers at the company to consider good tempered staffs for Informatics and information technology management positions in addition to other necessary prerequisites for leadership of such positions.

References and Notes
1. Aghaee, R. (2005), *The relationship between IT and performance*, Master thesis, Department of Management, Allameh Tabatabaei University, Tehran, Iran.
2. Alinston, H. (2002), *corporate planning, forecasting and the long move*, Futures, 34.
3. Faghihi, A. and Yaghoobi, N. (2004), *E-government: Choice or compulsion*, Management culture, 5, 2nd year, Qom High Education Complex, Qom, Iran.
4. Hosseini, S. (2005), *Analytical approach to automation and its impact on the national Iranian oil products distribution company, Shahrood region*. Master thesis, College of Administrative Sciences and Economics, Sistan and Balouchestan University, Zahedan, Iran.
5. Kuruppuarachchi, P., Ross, S., and Purne, M. (2002), *IT project implementation strategies for effective change*, Review Lojestic Informatin Management, 15(2).
6. Poorhassan, A. (2006), *Studying the impact of IT on productivity of Sistan and Baluchestan Regional Electric Company*, Master thesis, College of Administrative Sciences and Economics, Sistan and Balouchestan University, Zahedan, Iran.
7. Ryssel, R., Ritter, T., and Gemunden, H. G. (2004), *The impact of information technology deployment on trust, commitment and value creation in business relationships*, Journal of Business & Information Marketing, 19(3).
8. Standish Group. (2001), *Chaos 2001: a recipe for success*, Retrieved, Available at: www.standishgroup.com
9. Tadbir Internal Reports (2000), *Investments in IT and efficiency of it*, Tadbir, 133, Industrial Management Institute, Tehran, Iran.
10. Vareth, S. H. (1998), *Develop a comprehensive model to explain the impact of IT on organizational structure*, Message of Management, 1, first year, Shahid Beheshti University, Tehran. Iran.
11. Yardely, D. (2002) *Successful IT projects delivery: learning the lessons of project failure*, Addison Wesley, London.

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