

# INFLUENCE OF ICTs ON WORKFORCE PRODUCTIVITY IN EGYPTIAN INDUSTRIAL ORGANIZATIONS

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## **ABSTRACT**

*Present study aims to investigate the influence of ICTs dimensions (Information Technology (IT), Management Information System (MIS), Office automation (OA), Intranet and Internet) on workforce productivity for a group of industrial organizations in Alexandria - Egypt. The population of the study was managers and staff members working in different areas related to ICTs in the selected industrial organizations at various managerial levels. Descriptive-statistical combined research study was conducted. The selection of the participating industrial organization done using simple random sampling technique. Data collection done using questionnaires. In order to check the validity of the study instrument expert comments were used and the reliability of the questions calculated as 79% using Cronbach's Alpha coefficient. The analysis of instrument data done using single variable t-test, Friedman and variance analysis. The study findings revealed that the specified dimensions of ICTs positively affect workforce productivity of industrial organizations in Alexandria - Egypt.*

## **KEYWORDS**

*ICTs, Workforce Productivity, Egypt, Industrial Organizations*

## **1. RESEARCH OVERVIEW**

Currently, business organizations are seeking to find ways to maintain and enhance their competitive positions as a result for the increased global competition [1]. This is why ICTs are adopted by business organizations in order to control complex processes [2]. ICTs in response to competitive pressures can force business organizations to engage in strategic activities [3] and contribute to organizational productivity and overall performance [4] – [5].

The progression and advancement of the digital economy and literacy of ICTs has forced itself to become the vital component that change recent business settings and used as one of the strategic factors that improve businesses and workforce productivity. Today, Information Communication Technologies (ICTs) is progressing rapidly and studies at an extensive level try to establish a better perception of its effect on productivity. ICTs include the use of technologies in information production, information processing, information retrieval and information distribution. ICTs have brought a lot of advantages for its users personally and professionally [6].

ICTs have considerable potential to promote development and economic growth, as well as to foster innovation and improve productivity. The use of ICTs can result in remarkable gains in working environment, fairness, and standards of living [7]. This same idea was shared by [8] as they declared that the improvement of workforce productivity results in an enhancement in the

economic health and more importantly economic growth, which will result in achieving better life standards.

[9] Investigated business value of ICTs. He revealed that "productivity paradox" arise as a result of using recent ICTs no matter whether it is a developed or developing country. [10] Declared two main reasons to emphasize evaluation of the company's productivity instead of using alternative attributes like profitability. First is that productivity of the organization is obtained directly by changes in the production process. Second is that impact of ICTs on productivity could be easier than its impact on profitability. This considered as a major reason for conducting current research to investigate deeper in this issue, as well as supports the objective of current research to study the effect of ICTs on productivity.

[11] Investigated the relationship between the acceptance of ICTs and the organizational alertness, which is the ability of a business to adapt rapidly in response to changes in its business environment. They tried to find out how the acceptance of ICTs contributes to a firm's ability to be an agile competitor, and they concluded that technology usage had the strongest direct impact on organizational agility.

[12] Determined five issues needed to be done in order to say that we have an increase in productivity: 1) Reduce time and effort needed to acquire information resources and to communicate with others; 2) Effectively utilize knowledge work routines (methods, procedures, and technology); 3) Achieve learning curve reductions in effort and minimize relearning time for infrequently employed routines; 4) Maximize motivation through work structure; 5) Maximize both availability of attention and value from its use through work structure.

Recently, productivity has been a major focus for many researches [13] - [14] - [15] - [16]. Researchers agreed that workforce productivity and economic growth were stimulated by investment in ICTs. In the same context, [17] revealed that workforce productivity could be attributed to three different sources: investment in knowledge and ICTs, improvements of qualification through education and training in science and technology, or a combination of both of them.

Nowadays, there is a need to use ICTs in order to improve productivity of workers, organizations and even countries. Recently, people depend on technologies everywhere in their private and professional lives. Moreover, their lives have been driven by both technology and knowledge as the knowledge work has replaced traditional work and becoming the most important mode of production [18]. This is the same opinion of [19] as they revealed that ICTs are the most recent revolution in the history of mankind as it has the ability to transform the way people communicate, learn, do business and interact; thus affecting all areas of personal and professional lives at an enormous speed.

Cost of implementing ICTs is not compensated until it is followed by cost reduction and productivity improvement [20]. [21] Concluded that achieving high efficiency and effectiveness in business organizations requires investment in ICTs dimensions such as internet [22], office automation systems [23] as well as management information systems [24]. Deploying these systems results in a boost for the economy at large [25] as well as improving workforce productivity [26] – [27].

Organizations are investing in ICTs as it has a positive affect on productivity; thus achieving gains in both efficiency and profitability [28] – [21]. The effect of ICTs on organizations' productivity was subject of study for many researchers [29] - [30] - [31] - [32] - [33] - [34], most of these studies have been conducted in several developed countries (e.g. Germany, USA Japan,

England, , etc), and there have been few studies carried out in some of the developing countries [35].

Recent studies in this regard confirm the direct relationship between investment in advanced ICTs and applying workforce with high skills. Such studies revealed that there are strong relationships among ICTs attributes and the various actions of an organization. They show that the integration of these actions with ICTs have positive impacts on productivity. Among these studies [36] who studied the impacts of using ICTs on productivity. [37] Investigated the effect of ICTs on the performance of small and medium organizations. They revealed that the increasing use of ICTs plays important roles in increasing workforce productivity.

In the same context, [38] studied the impact of ICTs on productivity. They found out that the increasing usage of ICTs have significant roles in productivity enhancement. Moreover, [39] declared that the situation of the application of ICTs in business organizations is strong, and ICTs plays an important role as one of the strategic factors which can help improve business productivity.

In the same line of researches, [40] revealed that who are dealing with ICTs achieve long-term profitability through the achievement of: productivity improvement, service quality improvement, cost reduction and individuals' satisfaction. These positive results were confirmed as well by [41]. Earlier, [42] declared that the use of IT into business processes resulted in improving productivity. Researchers have found evidences for a positive effect of ICTs on productivity, and they are certain that ICTs has an enormous effect on business organizations productivity [43] – [44].

The study of the effect of ICTs on productivity is an important theoretical basis for how to use ICTs to improve productivity in general.

## **2. RESEARCH METHODOLOGY**

This is a descriptive-statistical combined type of research study. The present study aims to investigate the influence of ICTs dimensions (Information technology, Management Information System, Office automation, Intranet and Internet) on workforce productivity for a group of randomly selected industrial organizations in Alexandria - Egypt through surveying the directory of the listed industrial organizations with the Egyptian Ministry of Trade and Industry.

For the selection of the participating industrial organization a simple random sampling was used. The population of the study was managers and staff members working in different areas related to ICTs in the selected industrial organizations at various managerial levels.

The participating organizations reported that they have a number of 371 managers and staff members working in different areas related to ICTs at various levels. A questionnaire based on Likert Scale from completely disagree (1) to completely agree (5) was used as the data collection method. 371 questionnaires were distributed, but only 188 were completed and returned, thus will be considered as the study sample.

Expert comments were used to check the validity of the study, and the reliability of the questions was calculated as 79% using Cronbach's Alpha coefficient and confirmatory factorial analysis. Friedman and variance analysis, Single variable t-test were used for data analysis of the study.

### 3. DATA ANALYSIS

72% of the participating study sample was in the age group of 29 to 51 and a majority of them were employees with Bachelor degrees with various specializations. Also 83% of them had at least 18 years of working experience in the company.

Friedman test in table 1 revealed that dimensions priorities are different at significant level of 0.05. The IT dimension with a mean of 5.93 has the biggest effect on workforce productivity. Internet with a mean of 2.19 has the lowest effect.

Table 1. Friedman test results for grading ICTs dimensions

<b>Independent variable</b>	<b>Mean</b>	<b>Sig. level</b>	
IT	5.93	0.000	287.362
MIS	3.25		
Office automation	4.31		
Intranet	3.17		
Internet	2.19		

Effect of ICTs on workforce productivity is analyzed based on demographic variables (age, educational level, job and working background). Therefore ANOVA test was used as the variance analysis test. The result of the effect of ICTs on workforce productivity based on age is shown in table 2.

Table 2. Variance analysis test results for the effect of ICTs on workforce productivity based on age

<b>Sig. level</b>	<b>F</b>	<b>Independent variables</b>
Independent variable	1.112	0.436
IT	0.415	0.914
Office automation	0.917	0.743
Intranet	1.019	0.491
Internet	0.282	0.374

The result of the effect of ICTs on workforce productivity based on level of education is shown in table 3.

Table 3. Variance analysis test results for the effect of ICTs on workforce productivity based on level of education

<b>Sig. level</b>	<b>F</b>	<b>Independent variables</b>
Independent variable	0.702	0.150
IT	0.206	0.750
Office automation	0.139	0.327
Intranet	3.821	0.000
Internet	6.194	0.002

The result of the effect of ICTs on workforce productivity based on their job is shown in table 4.

Table 4. Variance analysis test results for the effect of ICTs on workforce productivity based on job

<b>Sig. level</b>	<b>F</b>	<b>Independent variables</b>
Independent variable	0.671	0.700
IT	0.190	0.207
Office automation	0.050	0.891
Intranet	1.005	0.231
Internet	3.491	0.002

The result of the effect of ICTs on workforce productivity based on their working background is shown in table 5.

Table 5. Variance analysis test results for the effect of ICTs on workforce productivity based on working background

<b>Sig. level</b>	<b>F</b>	<b>Independent variables</b>
Independent variable	0.366	0.821
IT	0.501	0.920
Office automation	2.007	0.371
Intranet	1.001	0.207
Internet	1.110	0.072

Table 6 shows the single variable t-test that was used in order to analyze instrument dimensions.

Table 6. Single variable t-test results for instrument questions

<b>Independent variables</b>	<b>Mean</b>	<b>T</b>	<b>Sig. level</b>
IT	5.0498	22.194	0.000
MIS	4.2522	15.478	0.001
Office automation	3.4811	21.566	0.000
Intranet	3.1077	7.007	0.000
Internet	3.2821	6.331	0.000

## 4. RESULTS

Although all the dimensions of information technology (Information technology, Management Information System, Office automation, Intranet and Internet) played a role in workforce productivity but the results of Friedman test revealed that dimensions priorities are different as the IT dimension has the biggest effect on workforce productivity, and the Internet dimension has the lowest effect.

Demographic variables such as: working background, job, age and educational level were the basis for analysing the effect of ICTs on workforce productivity.

Regarding the age variable, the observed  $F$  resulted from the variance analysis test show that this variable was not significant at the level of 0.05. Therefore there were no significant differences between the answers of participating study sample at different ages.

For educational level variable, the variance analysis test show that the observed  $F$  was significant at the level of 0.05 for both the intranet and the internet dimensions. Therefore there were significant differences between the answers of participating study sample with different levels of education.

Regarding the job variable, the observed  $F$  resulted from the variance analysis test show that this variable was significant at the level of 0.05 for only the internet dimension. Therefore there were significant differences between the answers of participating study sample with regard to their job. With regard to working background variable the results of the variance analysis test show that none of ICTs dimensions were significant at the level of 0.05. Therefore, answers of participating sample regarding their working background have no significant differences.

Single variable t-test was significant at the level of 0.05 for all the included ICTs dimensions; thus this research study can be conclude that each of the investigated ICTs dimension positively affect workforce productivity with regard to the randomly investigated industrial organizations.

## 5. CONCLUSION

Business organizations are increasingly adopting ICTs in order to improve workforce productivity.

It was revealed that through the investigated literature and the analysis of the collected data that using various ICTs dimensions had a positive effect on workforce productivity. This result is inline and is supported with a wide number of previous research studies.

It is highly recommended for the industrial organizations to invest in adopting various dimensions of ICTs in order to positively enhance and develop workforce productivity.

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